RECORD OF DECISION

FOR

LIBBY ASBESTOS SUPERFUND SITE

THE FORMER SCREENING PLANT AND SURROUNDING PROPERTIES

OPERABLE UNIT 2

LINCOLN COUNTY, MONTANA

May 2010

5/10/10

ENF-L 5/10/10 w/comments as in 001

EPR-SR 5/10/10

EPR-PS 5/10/10

CCP1 5/10/10

ENF-C 5/10/10

8EPR-SR 5/10/10

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Part 1
Declaration

Site Name and Location

The Libby Asbestos Superfund Site (Libby site) (CERCLIS #MT0009083840) is located in and around the Town of Libby, Montana. Libby is the county seat of Lincoln County and is in the northwest corner of Montana, about 35 miles east of Idaho and 65 miles south of Canada (Exhibit 1-1). Operable Unit 2 (OU2), also known as the "former screening plant and surrounding properties," is one of eight OUs at the site and is located near the intersection of Highway 37 and Rainy Creek Road, approximately 5 miles north of town.

Statement of Basis and Purpose

This decision document presents the selected remedy for OU2. The remedy selected in this ROD was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 and the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). The decision is based on the administrative record file for OU2 of the site. This document is issued by the EPA Region 8, the lead agency, and the Montana Department of Environmental Quality (MDEQ). Both EPA and MDEQ concur on the selected remedy presented herein.

The remedial action selected in this ROD is necessary to protect public health and welfare and the environment from actual or threatened releases of hazardous substances at the site. It will reduce the public health risks by blocking contaminant pathways to the available receptors. However, the selected remedy must be reevaluated when the site-wide risk assessment is completed. An ecological risk assessment is being developed at the mine site, OU3. Once that work is complete, EPA will build upon information gathered during the risk assessment for OU3 to identify potential pathways and receptors to evaluate ecological risk at OU2.

Assessment of Site

The response action selected in this ROD is necessary to protect the public health and welfare and the environment from actual or threatened releases of hazardous substances into the environment.

Description of Selected Remedy

The majority of the OU has already been remediated through past removal actions. The selected remedy will eliminate the remaining exposure pathway to the Libby Asbestos (LA) contamination present at the OU by removing the waste (in surface soils near sample location 1-03000) and by breaking the exposure pathway associated with disturbance of the source materials by in-place containment (contaminated soil within the west embankment of Highway 37). Institutional controls (ICs) and statutory reviews (five-year and other) will provide assurance that the integrity of the remedy will be protected.

EPA will also conduct a review to evaluate effectiveness of the remedy, as soon as sufficient new information concerning toxicity factors is available. If unacceptable

exposures are identified, EPA will take action as necessary to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs When the site-wide risk assessment is completed, the ICs will be revisited to determine whether any modification is needed.

Statutory Determinations

The selected remedy meets the mandates of CERCLA §121 and the National Contingency Plan. The remedy is protective of human health and the environment. It complies with all federal and state requirements that are applicable or relevant and appropriate to the remedial action, is cost effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

The remedy does not satisfy the statutory preference for treatment as a principal element of the remedy (this preference is triggered by the presence of a principal threat waste). Treatment of LA is not viable at OU2 for several reasons:

- **High relative cost**. Thermo-chemical treatment of asbestos wastes is significantly more expensive that off-site disposal. Because the wastes must be shipped to an off-site treatment facility in another state, treated, and then shipped back to the site for disposal, transportation costs are also disproportionately high given the small volume of wastes that would be removed

- **Inaccessibility of waste material**. Unless the design process finds that the structural integrity of the roadway would not be compromised by removing the soils, the highway right-of-way soils will be addressed through containment rather than removal. Treatment would not be possible because wastes would not be removed and thus could not be treated.

- **Lack of irreversibility data**. In addition to the cost issues related to treatment, the treatment technology is relatively new, so extensive data are not available to confirm long-term irreversibility of the treatment process.

- **Ongoing need for monitoring and five-year reviews**. Subsurface waste material will remain at depth at the site, so the treatment of the small amounts of remaining near surface LA would not negate the need for ongoing monitoring and five-year reviews. Thus no efficiencies or savings are gained regarding treatment in terms of long-term protectiveness

As noted above, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

Future Public Comment

When the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c). This determination will be published and an opportunity for public comment will be

provided. Similar opportunities for public comment will be provided at the time of the subsequent five-year reviews.

ROD Data Certification Checklist

Once a quantitative site-wide risk assessment is completed and a cleanup level is established, the ROD for this OU will be modified, as appropriate. If modified, the ROD will include this new information and will incorporate all necessary remedial actions, modifications of the ICs, and modifications to operation and maintenance plans in order to properly manage the residual contamination in a manner that will protect human health and the environment.

The following information is included in the decision summary section (Part 2) of this ROD. Additional information can by found in the administrative record file for this site.

- Contaminants of concern and their respective concentrations
- Risks represented by the contaminants of concern
- How source materials constituting principal threats are addressed
- Current and reasonably anticipated future land use assumptions used in the risk assessment
- Potential land use that will be available at the Site as a result of the selected remedy
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected
- Key factors that led to selecting the remedy

Cleanup criteria for levels of concern and the basis for those levels are typically included in a ROD. However, a site-wide risk assessment has not yet been completed. Although an OU-specific human health risk assessment was conducted for OU2, it did not include LA-specific toxicity values. In the absence of established quantitative, risk-based cleanup levels, EPA is removing and/or capping all visible vermiculite and any detectable LA thereby breaking complete exposure pathways and reducing future potential risk for LA exposure. Exceptions include vermiculite that is otherwise well-contained. If LA source materials are encountered during excavation activities, removal will continue until the source material is removed (to a maximum of 3 feet). If contamination continues below 3 feet, a visible barrier marking the extent of excavation will be placed before backfilling. Once sufficient data are obtained to establish the LA-specific toxicity values, the site-wide risk assessment will be conducted to verify that the exposure pathway is broken.

Authorizing Signatures

Carol L. Campbell
Assistant Regional Administrator
Office of Ecosystem Protection and Remediation

5/10/10
Date

Richard Opper, Director
Montana Department of Environmental Quality

5/10/10
Date

RECORD OF DECISION

FOR

LIBBY ASBESTOS SUPERFUND SITE

THE FORMER SCREENING PLANT AND SURROUNDING PROPERTIES

OPERABLE UNIT 2

LINCOLN COUNTY, MONTANA

Part 2
Decision Summary

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Part 2 Decision Summary

List of Exhibits

Appendix

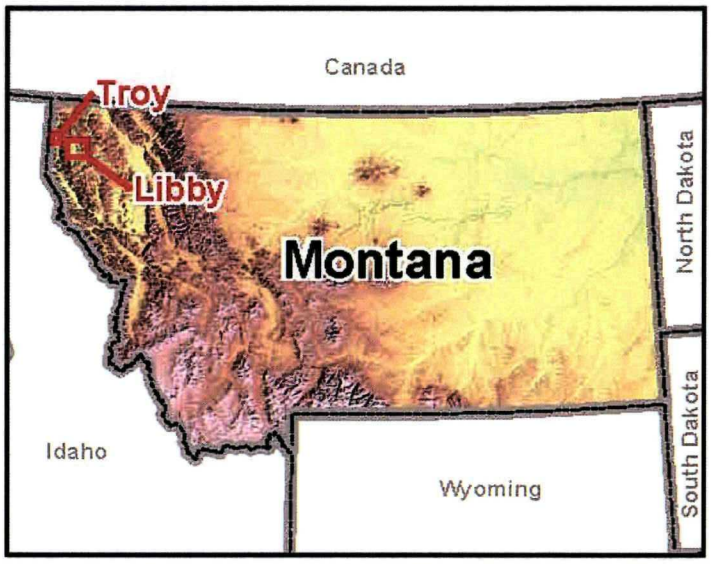
Acronyms

ABS ..... activity based sampling
ACM ..... asbestos containing material
ARAR ..... applicable or relevant and appropriate requirement
BMPs ..... best management practices
BNSF ..... Burlington Northern Santa Fe
CAG ..... Community Advisory Group
CDM ..... CDM Federal Programs Corporation
CERCLA ..... Comprehensive Environmental Response, Compensation, and Liability Act
CICs ..... community involvement coordinators
CSM ..... conceptual site model
CSS ..... Contaminant Screening Study
DQOs ..... data quality objectives
EPA ..... United States Environmental Protection Agency
ERS ..... Environmental Resource Specialist
FS ..... feasibility study
ft^2 ..... square foot
Grace ..... W.R. Grace and Company
ICs ..... institutional controls
KDC ..... Kootenai Development Corporation
Libby site ..... Libby Asbestos Superfund Site
LA ..... Libby amphibole asbestos
MCL ..... maximum contaminant level
MDEQ ..... Montana Department of Environmental Quality
MDT ..... Montana Department of Transportation
NCP ..... National Oil and Hazardous Substances Pollution & Contingency Plan
ND ..... non-detect
NPL ..... National Priorities List
O&M ..... operation and maintenance
OU ..... operable unit
PLM ..... polarized light microscopy
PLM-VE ..... polarized light microscopy visual area estimation method
PPE ..... personal protective equipment
QA/QC ..... quality assurance/quality control
RAO ..... remedial action objective
RG ..... remedial goal
RI ..... remedial investigation
ROD ..... record of decision
s/cc ..... structures per cubic centimeter
TAG ..... Technical Assistance Group
TCCT ..... thermo-chemical conversion treatment
TEM ..... transmission electron microscopy
°F ..... degrees Fahrenheit

Section 1 Introduction

1.1 Site Name and Location

Exhibit 1-1. Site Location Map



The Libby Asbestos Superfund Site (Libby site) (CERCLIS # MT0009083840) is located in and around the Town of Libby, Montana. Libby is the county seat of Lincoln County and is in the northwest corner of Montana, about 35 miles east of Idaho and 65 miles south of Canada (Exhibit 1-1). The town lies in a picturesque valley carved by the Kootenai River and framed by the Cabinet Mountains to the south. The community's assets include clean water, beautiful scenery, and recreational opportunities such as fishing, hiking, hunting, boating and skiing.

Operable Unit 2 (OU2), also known as the former Screening Plant and Surrounding Properties. It is located near the intersection of Highway 37 and Rainy Creek Road, approximately 5 miles north of town.

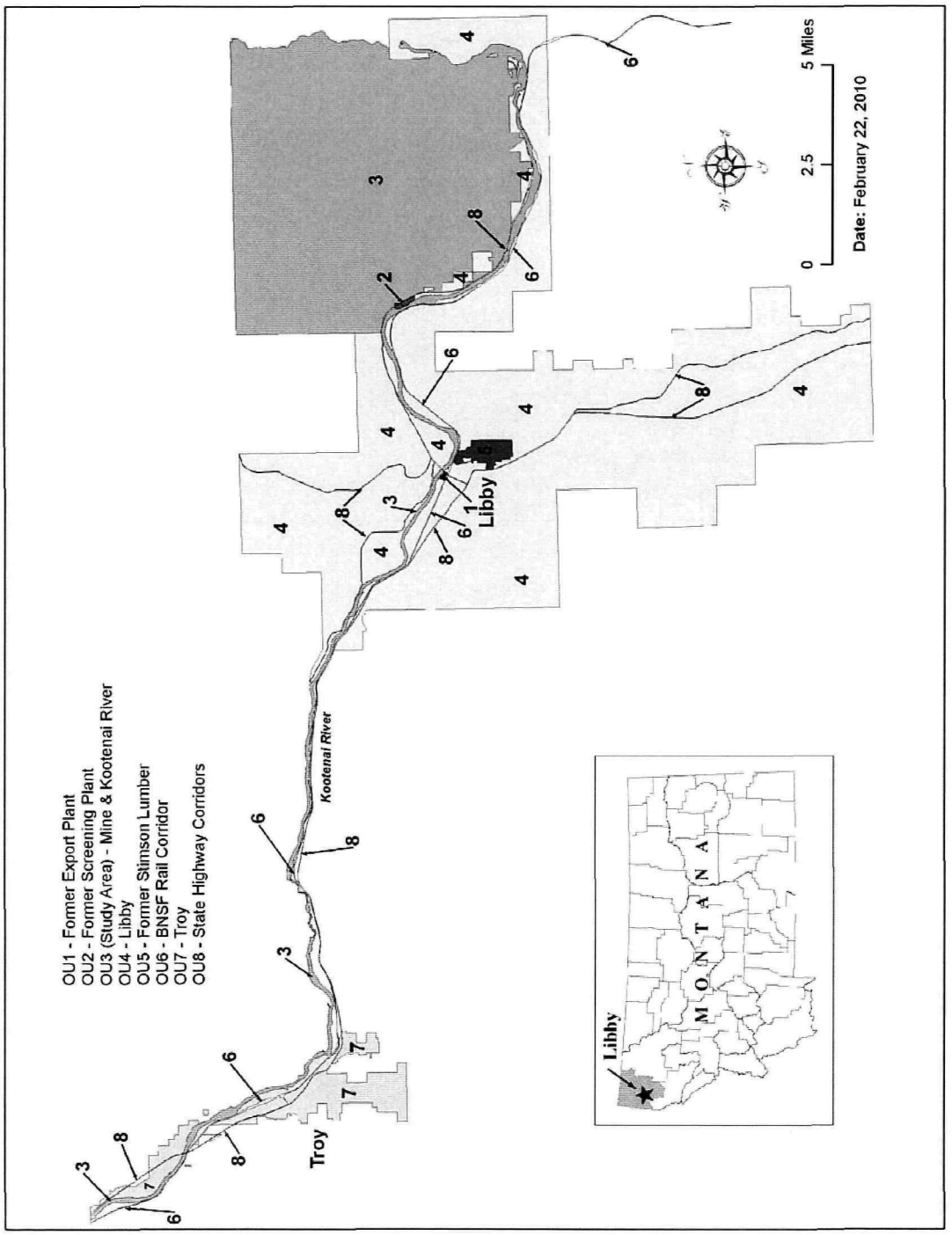
1.2 Key Features of the Libby Site and OU2

1.2.1 Site OUs

To facilitate a multi-phase approach to remediation of the Libby site, eight separate OUs have been established. These OUs are shown on Exhibit 1-2 and include:

- **OU1**. The former Export Plant is situated on the south side of the Kootenai River, just north of the downtown area of the City of Libby, Montana. OU1 includes the embankments of Montana Highway 37, the former Export Plant, and Riverside Park. The property is bounded by the Kootenai River on the north, Highway 37 on the east, the Burlington Northern Santa Fe (BNSF) railroad thoroughfare on the south, and State of Montana property on the west.

Exhibit 1-2 OUs at The Libby Site



- **OU2.** OU2 includes areas impacted by contamination released from the former Screening Plant. These areas include the former Screening Plant (Subarea 1), the Flyway property (Subarea 2), a privately-owned property (Subarea 3), and the Rainy Creek Road Frontage and Highway 37 right-of-way adjacent to Rainy Creek Road (Subarea 4).

- **OU3.** The mine OU includes the former vermiculite mine and the geographic area (including ponds) surrounding the former vermiculite mine that has been impacted by releases from the mine, including Rainy Creek and the Kootenai River. Rainy Creek Road is also included in OU3. The geographic area of OU3 is based primarily upon the extent of contamination associated with releases from the former vermiculite mine.

- **OU4.** OU4 is defined as residential, commercial, industrial (not associated with former W.R. Grace Company [Grace] operations), and public properties, including schools and parks in and around the City of Libby, or those that have received material from the mine not associated with Grace operations. OU4 includes only those properties not included in other OUs.

- **OU5.** OU5 includes all properties that were part of the former Stimson Lumber Mill and that are now owned and managed by the Kootenai Business Park Industrial Authority.

- **OU6.** The rail yard owned and operated by BNSF is defined geographically by the BNSF property boundaries and extent of contamination associated with BNSF rail operations. Railroad transportation corridors are also included in this OU and have not been geographically defined.

- **OU7.** The Troy OU includes all residential, commercial, and public properties in and around the Town of Troy, approximately 20 miles west of downtown Libby.

- **OU8.** OU8 is comprised of the US and Montana State highways and secondary highways that lie within the boundaries of OU4 and OU7.

1.2.2 Site Contamination

OU2 was historically owned and used by Grace for stockpiling, staging, and distributing vermiculite and vermiculite concentrate to vermiculite processing areas and insulation distributors outside of Libby. The vermiculite deposit that was mined by Grace contains a distinct form of naturally-occurring amphibole asbestos that is comprised of a range of mineral types and morphologies. In various past reports, this form of amphibole asbestos has been termed interchangeably by the EPA as Libby amphibole asbestos or Libby asbestos (LA). The term LA refers generally to amphibole materials that originated in the Libby vermiculite deposit, have the ability to form durable, long, and thin structures that are generally respirable, can reasonably be expected to cause disease, and hence are considered the contaminant of concern at the site.

Because vermiculite mined from Libby has been found to be contaminated with LA, known to cause human health effects, the United States Environmental Protection Agency (EPA) initiated an emergency response action in November 1999 to address questions and concerns raised by citizens of Libby regarding possible ongoing exposures to asbestos fibers as a result of historical mining, processing, and exportation of asbestos-containing vermiculite.

Vermiculite and LA are present in subsurface soil. Exposure to the residual contamination has been mitigated by removal of surface soils and the extensive cap placed across the OU during removal activities, with the exception of an isolated portion of the Highway 37 right-of-way and in the area surrounding sample location 1-03000. Both of these locations are within the Flyway (Subarea 2).Contamination at depth is present in each of the subareas at the site as described below:

- **Former Screening Plant (Subarea 1).** The majority of residual contamination is present at depths greater than or equal to 4 feet below ground surface (bgs) and in several isolated areas at depths less than 4 feet bgs within the former Screening Plant area north of Rainy Creek. In general, removal activities in this subarea were pre-established to 4 feet bgs and contamination was encountered at this depth.

- **The Flyway (Subarea 2).** The majority of excavated areas in the Flyway met EPA's clearance criteria of less than (<) 1 percent (%) LA at depth, at depths varying from less than 1 foot bgs to greater than 4 feet bgs. However, LA concentrations ≥1% have been detected in confirmatory soil samples collected at the eastern boundary of the Flyway within the Highway 37 right-of-way at depths up to 2 feet bgs. Within the Highway 37 right-of-way is an isolated area with concentrations of LA of greater than (>)1% at less than 1 foot bgs. LA was also observed in surface soils in one area (area surrounding sample 1-03000) not previously remediated at concentrations of <1%.

- **Private Property (Subarea 3).** The majority of this subarea does not contain residual contamination; however, one confirmation soil sample collected along the northern portion of the property contained <1% LA at a depth of 1 foot bgs.

- **Rainy Creek Road Frontages (Subarea 4).** Residual contamination is present along these frontages at a depth between 1 and 2 feet bgs.

The details regarding how the above conclusions were reached are provided in the remedial investigation (RI) report (EPA 2009a) and are briefly discussed in Section 2.

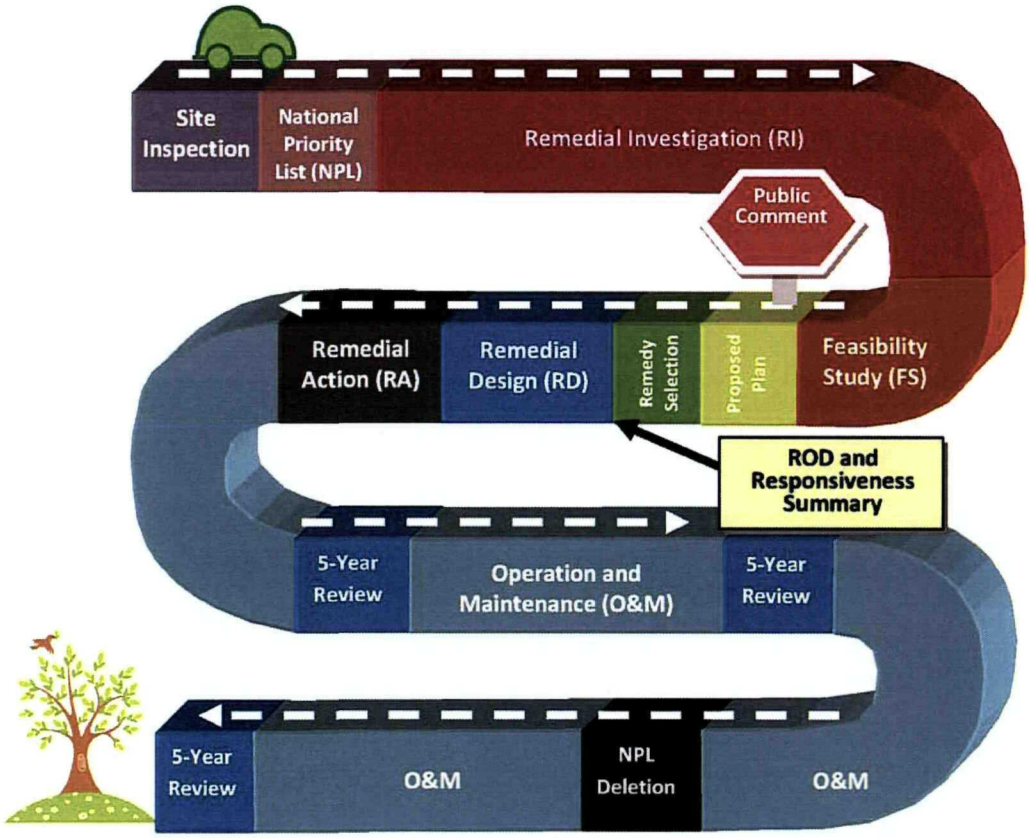
1.3 ROD Format

This Record of Decision (ROD) is the decision document at the end of a detailed investigation and evaluation of conditions at OU2 (Exhibit 1-3). Since the selected remedy will leave waste in place, the remedy will be evaluated at least every five years to ensure that the remedy remains protective. Any new information that may

impact portectiveness of the remedy will be considered in accordance with the review requirements at CERCLA Section 121(c).

If unacceptable exposures are identified, EPA will take action as necessary to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening institutional controls (ICs). It is anticipated that current research efforts will result in data that will contribute to the development of LA-specific toxicity values. When those toxicity values are available, EPA will reevaluate this remedy to ensure continued protectiveness.

Exhibit 1-3. The Superfund Process – The Road to the ROD



Once the remedy has been implemented and performance standards have been met, there will be an opportunity to delete this operable unit from the national priorities list. ICs and operation and maintenance (O&M) will continue. Deletion from the National Priorities List (NPL) does not preclude any additional response actions to ensure protectiveness of the remedy.

EPA's detailed investigation and evaluation of conditions at OU2 included performance of a remedial investigation/feasibility study (RI/FS) for OU2 and the

completion of numerous removal actions to address significant human health risks during completion of the RI and FS. The RI report for OU2 includes a comprehensive description of the nature and extent of contamination and a description of past investigative and removal actions at the site, as well as the risk assessment. The FS report for OU2 uses information from the RI to perform a systematic analysis to determine the need for, and scope of, any required remedial action. The steps leading up to the ROD also included numerous opportunities for public involvement, including preparation of a proposed plan (mailed to all Libby residents on September 14, 2009), a public meeting, and a 120-day public comment period.

This ROD documents EPA's selected remedy for OU2. The next step in the Superfund process will be completion of a remedial design followed by implementation of a remedial action based on the selected remedy documented in this ROD.

This ROD is organized into the following sections:

- **Section 1 - Introduction**. Provides a very brief introduction to the ROD.
- **Section 2 - Site History and Enforcement Activities.** Provides a brief history of the site, OU2, and EPA's activities.
- **Section 3 - Highlights of Community Participation.** Describes the range of community outreach activities conducted site wide and at OU2.
- **Section 4 - Scope and Role of OU2**. Describes how the actions taken at OU2 fit into the overall scope of the Libby site.
- **Section 5 - Summary of Site Characteristics.** Contains an overview of the site, conceptual site model (CSM), and a summary of the results of the RI.
- **Section 6 - Current and Potential Future Land and Resource Uses**. Describes land use and how resources (e.g., surface water) will be addressed.
- **Section 7 - Summary of Site Risks**. Discusses the human health risk assessment for OU2, including risk estimates.
- **Section 8 - Remedial Action Objectives and Remedial Goals**. Discusses the goals and objectives developed by EPA to protect human health and the environment at the Libby site in general and OU2 in particular.
- **Section 9 - Description of Alternatives**. Describes the remedial alternatives developed and evaluated in the FS, including a description of remedy components, common elements and distinguishing features, and expected outcomes.
- **Section 10 - Comparative Analysis of Alternatives**. Presents a summary of the remedial alternatives that were retained for detailed analysis against the two threshold criteria and five balancing criteria in the FS.

- **Section 11 - Principal Threat Wastes**. Identifies the principal threat waste at OU2 and discusses how the selected remedy will prevent exposure to it.

- **Section 12 - Selected Remedy**. Provides a detailed description of the selected remedy, including its components, cost, expected outcomes, performance standards, and compliance with EPA's environmental justice mandate.

- **Section 13 -Statutory Determinations**. Describes how the selected remedy is protective of human health and the environment, complies with or appropriately waives applicable or relevant and appropriate requirements (ARARs), is cost effective, and utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

- **Section 14 - Documentation of Significant Changes**. Confirms that no significant changes were made to the Preferred Remedy that was outlined in the proposed plan prior to its becoming the selected remedy described in this ROD.

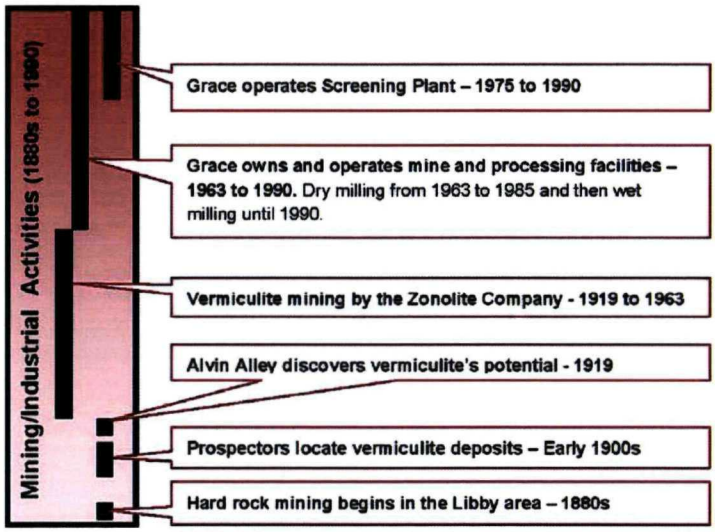
- **Section 15 - References**. Provides a list of references cited in the ROD.

Section 2 Site History and Enforcement Activities

2.1 Site Background and History

Numerous hard rock mines have operated in the Libby area since the 1880s, but the dominant impact to human health and the environment in Libby has been from vermiculite mining and processing. Prospectors first located vermiculite deposits in the early 1900s on Rainy Creek northeast of Libby. Edward Alley, a local rancher, was also a prospector and explored the old gold mining tunnels and digs in the area. Reportedly, while exploring tunnels in the area, he stuck his miner's candle into the wall to chip away some ore samples. When he retrieved his candle, he noticed that the vermiculite around the candle had expanded, or "popped," and turned golden in color.

Exhibit 2-1. History of Mining Activities Relevant to OU2



In 1919 (Exhibit 2-1), Alley bought the Rainy Creek claims and started the vermiculite mining operation called the "Zonolite Company." While others thought the material was useless, he experimented with it and discovered it had good insulating qualities. Over time, vermiculite became a product used in insulation, feed additives, fertilizer/soil amendments, construction materials, absorbents, and packing materials. Many people used vermiculite products for insulation in their houses in and around the Libby site and soil additives in their gardens. In 1963, Grace bought the mine and associated processing facilities and operated them until 1990.

Operations at the mine included blast and drag-line mining and milling of the ore. Dry milling was done through 1985, and wet milling was done from 1985 until closure in 1990. After milling, concentrated ore was transported down Rainy Creek Road by truck to a screening facility (known today as the former Screening Plant) adjacent to Highway 37, at the confluence of Rainy Creek and the Kootenai River. Here the ore was size-sorted and transported by rail or truck to processing facilities in Libby and nationwide. At the processing plants, the ore was expanded or "exfoliated" by rapid heating, then exported to market via truck or rail. Historic maps show the location of the "Zonolite Company" processing operation at the edge of the lumber mill, near

present day Libby City Hall. This older processing plant was taken off line and demolished sometime in the early 1950s. The other processing plant (known today as the former Export Plant – OU1), was located near downtown Libby near the Kootenai River and Highway 37. Expansion operations at the site ceased sometime prior to 1981, although existing site buildings were still used to bag and export milled ore until 1990.

After operations ceased, Grace completed reclamation of the vermiculite mine. Reclamation included demolition of e: and revegetation. The former Screening Plant was sold and converted into a nursery and was used for that purpose until 2000. Over the course of Grace's operation in Libby, invoices indicate shipment of nearly 10 billion pounds of vermiculite from Libby to processing centers and other locations. Most of this was shipped and used within the United States. Nearly all of this material ended up in a variety of commercial products that were marketed and sold to millions of consumers. The following subsections describe the historic, current, and anticipated future use of each subarea of OU2.

Exhibit 2-2. OU2 Site Layout

2.1.1 Former Screening Plant (Subarea 1)

The former Screening Plant is located approximately 5 miles northeast of Libby on the east side of the Kootenai River (Exhibit 2-2). The area is approximately 21 acres in size, and is bordered by Highway 37 to the northeast, the privately owned property to the southeast, Flyway property to the south, and the Kootenai River to the west. From 1975 to 1990, the Screening Plant was used by Grace to screen mined vermiculite by size and grade. The vermiculite was transported from the mine to the site by truck, sorted, and bulk stored in two sheds at the facility. The vermiculite was then loaded onto a conveyor system and transported across the Kootenai River to a conveyor unloading station. Once the vermiculite was transported across the river, it was either

trucked to the local export plant (OU1) for processing and shipping or loaded onto rail cars for transportation and distribution to expansion plants outside of Libby.

From 1993 to 1999, the former Screening Plant was used as a fully-operational retail nursery (Raintree Nursery) business where plants, flowers, and trees were grown, stored, and sold. Related plant-care items were also stored and sold at the nursery. The owners of the property lived on the site in a one-story structure that served both as an office and a residence. The largest structure on the property was referred to as the long shed. Approximately one-third of the long shed was used to store nursery supplies, tools, and equipment for the nursery business; the remaining two-thirds were leased to outside parties for storing recreational vehicles, trailers, boats, automobiles, and other items. Five greenhouses were used for growing plants, flowers, and shrubs, and a number of smaller buildings and support structures were used in the nursery operation. Two reinforced concrete tunnels were used to grow mushrooms that were shipped to the Far East for use as medical treatments. A number of steel tanks, hoppers, silos, and other remnants of the former mining operations at the former Screening Plant were stored at the site.

Due to the LA contamination associated with vermiculite from the Libby mine, the former Screening Plant has undergone extensive investigation and removal actions since EPA began emergency response activities in Libby in 1999. The property is currently privately owned and is being used for residential purposes. It is anticipated that the property will continue to be used for residential and/or commercial purposes.

2.1.2 Flyway (Subarea 2)

Currently owned by Kootenai Development Corporation (KDC) (a subsidiary of Grace), the area commonly referred to as the Flyway is comprised of approximately 19 acres northeast of Libby, immediately south of the former Screening Plant and the privately-owned parcel (Exhibit 2-2). The Flyway is bounded by Highway 37 to the northeast, a residential subdivision (*River Runs through It*) to the south, the Kootenai River to the southwest, and the former Screening Plant and private property to the north. The Flyway is accessed through a gated entrance to the adjacent private property off Highway 37. For the purpose of this report, the Flyway area includes the Highway 37 right-of-way, which is adjacent to the west side of Highway 37. The right-of-way is used and maintained by the Montana Department of Transportation (MDT).

The Flyway housed a pump that was used during vermiculite mining operations to convey water from the Kootenai River to the mine site. The pump house, located close to the Kootenai River, has since been abandoned and the pump is no longer functional. The interior insulation of this metal structure was removed and all parts of the building were washed. The empty structure was left on-site for possible future use.

In 1999, when EPA first visited the property, the Flyway was found to contain several vermiculite piles. One portion of the property had been covered with imported fill and it was suspected that vermiculite-containing material had been moved from the former Screening Plant and used as fill to level parts of the Flyway where drainages existed. Following investigation work performed by EPA as part of the Libby emergency response, a portion of the Flyway was remediated in 2001 by Grace at the direction of EPA. In 2003, remediation at the site was performed by EPA, in 2004 additional remediation was performed by Grace at the direction of EPA, and in 2005, the Highway 37 right-of-way was remediated by EPA. Details of investigation and remediation activities conducted at the Flyway are provided in Section 2, of this report. The Flyway is currently vacant, undeveloped land. At this time, there are no plans to develop this property by the owners.

2.1.3 Private Property (Subarea 3)

The private property of Subarea 3 consists of an approximate 1-acre parcel situated between the former Screening Plant and the Flyway, and bordered by Highway 37 to the northeast (Exhibit 2-2). For the purpose of this report, this private property includes the Highway 37 right-of-way adjacent to the west side of Highway 37. A continuation of the Flyway right-of-way, this right-of-way is used and maintained by the MDT.

Under Grace's ownership, the property was likely used for vermiculite mining-related activities, such as the storage or staging of equipment and materials. In recent history, portions of the property were used for equipment decontamination during remediation work at the former Screening Plant and the Flyway (the property was vacant and not in use at the time of cleanup activities). The property underwent EPA investigation and remediation as discussed in Section 2.3 of this ROD. The private property is currently vacant, undeveloped land. There are currently no plans to develop the property by the owners.

2.1.4 Rainy Creek Road Frontages (Subarea 4)

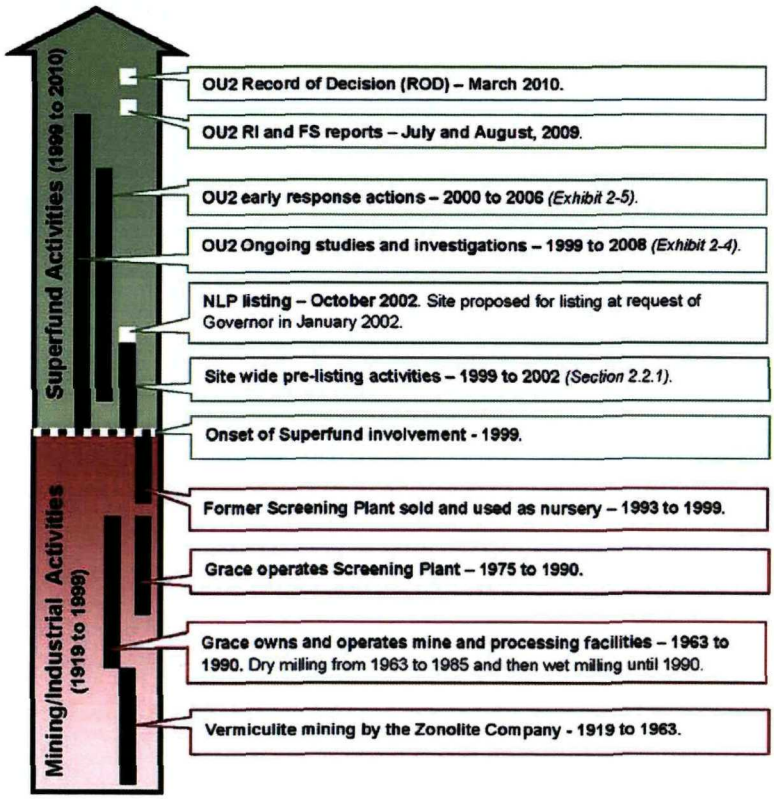
The Rainy Creek Road Frontages are currently privately owned and lie immediately north and south of Rainy Creek Road on the east (i.e., mine) side of Highway 37 (Exhibit 2-2). Approximately 45,000 square feet (ft^2) of land comprises the north frontage; approximately 39,000 ft^2 comprises the south. For a short period, numerous trees were stored at the south frontage for use during restoration at the former Screening Plant. The Rainy Creek Road Frontages were remediated by EPA in 2005. The Rainy Creek Road Frontages are currently vacant, undeveloped land. It is anticipated that the property will remain as such.

2.2 Enforcement Activities

In response to local concern and news articles about asbestos-contaminated vermiculite, EPA sent an Emergency Response Team to Libby, Montana in late November 1999 (Exhibit 2-3). EPA's first priority was to assess the current risk to public health from asbestos-contaminated vermiculite in Libby. EPA then began taking necessary actions to reduce that risk.

In December 1999, EPA collected nearly 700 samples from air, soil, dust and insulation at homes and businesses. Indoor air sample results were released in January - first to property owners and then to the media and general public. EPA also moved immediately to locate areas in and near Libby that were likely to have high levels of contamination such as two former vermiculite processing facilities.

Exhibit 2-3. Enforcement and Mining/Industrial Activities at OU2



EPA also looked at general asbestos exposures in the community and at health effects seen in people who had little or no association with the vermiculite mine in Libby. EPA worked closely with local, state and federal agencies to understand how people might come into contact with asbestos-contaminated vermiculite and what can be done to prevent future exposures - in Libby and elsewhere.

In January, 2002 EPA received a formal written request from Governor Martz that Libby be added to the NPL. In exercising this request, the Governor used the State of Montana's one-time privilege of naming a site as its highest priority for designation to the NPL. The site was added to the NPL in October 2002.

2.2.1 Site-Wide EPA Activities

EPA's first priority at Libby was to reduce risk as quickly as possible. Early removal activities focused on understanding the sources of contamination and removing those source areas that presented the highest potential risk.

2.2.1.1 Activities Conducted Prior to NPL-Listing

Between 1999 and 2002, EPA's activities in Libby included:

- **1999.** Opened the EPA Information Center.
- **1999 to 2002.** Investigated sources of contamination.
- **2000 and 2001.** Removed several major source areas (Plummer Elementary, Libby High School, Libby Middle School, Cemetery Park Ballfields, Export Plant, Screening Plant).
- **2002.** Built a special cell in the Lincoln County Landfill for disposal of asbestos wastes; reconsidered standard protocols for analyzing asbestos samples and assessing risk from asbestos exposure and tested methods of remediating indoor contamination, and began a formal human health risk assessment; proposed the site for the NPL at the request of the Governor; expanded the Superfund investigation to include extensive sampling and analysis and additional risk assessment; began inspection and sampling of over 3000 residential and commercial properties as part of the Contaminant Screening Study (CSS); and authorized and began removal of vermiculite from Libby homes and businesses (26 homes completed in 2002).

2.2.1.2 Activities Conducted After NPL Listing

After the Libby site was added to the NPL in October 2002, enforcement activities intensified. Listed below are the major activities conducted since 2003:

- **2003.** Completed the CSS (over 1,200 properties inspected or sampled), completed 157 residential or commercial cleanups and the city boat ramp cleanup, and published interim cleanup standards and protocols.
- **2004.** Completed 170 residential or commercial cleanups and cleanup of BNSF rail yard and Flyway property. Announced that Troy will be included in the cleanup.
- **2005.** Completed 225 residential or commercial cleanups, conducted special sampling to verify protectiveness of cleanup, initiated RI/FS, and began initial coordination for 2006 Troy investigations.
- **2006.** Completed 216 residential or commercial cleanups and initiated Outdoor Ambient Air sampling program.
- **2007.** Completed 160 large and complicated cleanups; continued Outdoor Ambient Air sampling program; initiated Activity Based Sampling (ABS) program, Environmental Resource Specialist (ERS) program, and sampling in Troy; and identified toxicity studies for risk assessment.
- **2008.** Completed 143 residential or commercial cleanups in Libby and 6 in Troy; completed initial OU4 residential ABS; continued toxicity studies for risk

assessment, sampling in Troy, and investigations at all OUs; and work begins on creeks with contaminated rip-rap.

- **2009**. Completed 159 residential or commercial cleanups, sampling in Troy, removal at Cabinet View Golf Course, creek removals at Pipe Creek and Libby Creek, and various investigations.

2.2.2 OU-Specific Enforcement Activities

Multiple investigation, pre-removal, and removal events have occurred at OU2 to date. Almost all of these activities were conducted by EPA, with the remainder being conducted by Grace. These activities are detailed in the OU2 RI report, along with tables of analytical results and figures showing the locations of the specific activities. This section provides only a very brief overview by subarea. Investigation activities are summarized in Exhibit 2-4, and removal activities are summarized in Exhibit 2-5.

2.2.2.1 Former Screening Plant (Subarea 1)

- **Investigation Soil Sampling - December 1999**. Site characterization began with sampling at two depths along a grid. Widespread vermiculite containing soil was observed. Most of the 85 samples contained LA (<1 to 4%).

- **Investigation Soil Sampling - March 2000.** Nineteen samples were collected from stockpiled vermiculite and other areas not previously investigated at two depths. Most samples contained detectable LA ranging from <1 to 5%.

- **Investigation Dust Sampling - March 2000**. Five samples were collected from items stored in the long shed. LA ranged from 16,984 to 670,852 structures per square centimeter. Items were disposed at the mine site.

- **Investigation Soil Sampling - July 2000.** Thirty-six samples were collected as part of a site-wide soil sampling effort along eastern portion of OU2 (mostly from eastern boundary of site or along the east bank of Kootenai River) and 20 contained LA (<1 to 2%).

- **Investigation Personal Air Samples - July 2000.** Two samples were collected during sweeping activity in and near long shed to determine resulting LA concentrations (0.2678 to 4.9986 structures per cubic centimeter (s/cc)).

Exhibit 2-4. Summary of Investigation Activities at OU2

Year	Event	Summary
Screening Plant (Subarea 1)		
1999, Dec	Soil sampling	Baseline evaluation of LA soil contamination on-site.
2000, March/ Aug	Soil, dust, and scenario-based personal air sampling	Soil sampling to supplement 1999 investigation. Dust sampling to determine if contamination was present. Scenario-based sampling to determine concentrations of LA from building maintenance activities.
2001, April - May	Soil sampling	Soil sample event to supplement the 1999 investigation and better characterize site soils.
2003, March	Soil and bulk material sampling	Sampling to determine if soil contained in the root mass of trees removed from the OU was contaminated with LA.
Flyway (Subarea 2)		
2000, March	Soil sampling	Baseline evaluation of LA soil contamination on-site.
2000, Sept		Sampling from test pits to document possible exposure during an archaeological investigation.
2001, March		Trenching to determine vertical extent of LA contamination in soil not previously investigated.
2001, May and July		Soil sample event to supplement the 2000 investigation and better characterize site soils.
2003, July		Sampling to supplement 2000 investigation, including portions of the Highway 37 right-of-way.
2005, June		Soil sampling activities to determine the extent of soil requiring removal along the Highway 37 right-of-way.
2007, Aug 2008, June	Ambient air sampling	Outdoor ambient air samples collected
Private Property (Subarea 3)		
2000, April	Soil sampling	Sampling of vermiculite stockpiles and soil areas.
Rainy Creek Road Frontage (Subarea 4)		
2003, May	Soil sampling	Baseline evaluation of LA soil contamination.
2003, Nov		Confirmation samples of decontamination run-off water.

- **Investigation Soil Sampling – August 2000.** Sampling and test pit excavation determined the vertical extent of contamination (74 soil samples and 16 test pit locations up to 13 feet bgs). Thirty-three samples contained LA (<1 to 5%).

Exhibit 2-5. Summary of Response Action Removals at OU2

Year	Material Removed	Summary of Response Actions
Former Screening Plant (Subarea 1)		
2000, August through October	Building demolition materials, vermiculite contaminated soil, and debris	Demolition of all buildings except the long shed. Removal of miscellaneous metal debris, vegetative covering, and excavation of contaminated soil. All debris and soil was stockpiled for future disposal at the former vermiculite mine.
2001, August through November		Demolition of the long shed. Continued excavation and disposal of contaminated soil at the former vermiculite mine.
2002, August through October	Vermiculite contaminated soil, debris, trees, and vegetative material	Removal of decontamination pad and surrounding soil. Excavation along the banks of Rainy Creek, including removal of trees and vegetation and disposal of contaminated soil at the former vermiculite mine.
2002, October 2003, April	Vermiculite contaminated soil, granular pad	Removal of vermiculite contaminated soil and granular pad during installation of potable water well.
2003, September 2004, August	Vermiculite contaminated soil	Excavation within the Highway 37 right-of-way and disposal of contaminated soil at the Former Libby Vermiculite Mine.
2005, July 2006, May		Removal of vermiculite contaminated soil and granular pad during installation of potable water well.
Flyway (Subarea 2)		
2001, September	Vermiculite contaminated soil	Excavation and disposal of vermiculite contaminated soil at the Former Libby Vermiculite Mine site.
2004, July through November		Continued excavation and disposal of vermiculite contaminated soil at the Former Libby Vermiculite Mine.
2005, June		Excavation within the Highway 37 right-of-way adjacent to the Flyway and disposal of contaminated soil at the former vermiculite mine.
Private Property (Subarea 3)		
2005, June	Vermiculite contaminated soil	Excavation in conjunction with removal activities along Hwy 37 right-of-way and disposal of contaminated soil at the Former Libby Vermiculite Mine.
Rainy Creek Road Frontage (Subarea 4)		
2004, August through October	Vermiculite contaminated soil	Excavation along the North and South frontages and disposal of vermiculite contaminated soil at the former vermiculite mine.
2006, August		Excavation to locate and repair a damaged water line and disposal of vermiculite contaminated soil at the former vermiculite mine.

- **Removal Activities – August to October 2000.** Contaminated soil was removed from the northern portion following the removal, disposal, and/or relocation of all stored items and demolition of all buildings (except long shed). Soil was excavated to 4 feet to mitigate exposure risk. The remaining contaminated soil was covered with geotextile and fill. Most confirmation samples contained LA (<1 to 8%), indicating that contamination remains at depth. Vermiculite containing soil

may be found at shallow depths below 2006 as-built site elevation (e.g., near utility poles, guy wires, roadways edges, property and boundary markers, and U.S. Forest Service property bounds). Soil was stockpiled in and after confirmation of lack of non-LA contaminants was disposed at mine.

- **Investigation Soil Sampling - March 2001.** Investigation characterized areas not previously sampled. Four samples were collected from an undetermined area north of OU2 (6 to 30 inches bgs) and all contained <1% LA.

- **Investigation Soil Sampling -April and May 2001.** A total of 50 samples were collected from Kootenai River bank and lower reach of Rainy Creek (0 to 6 inches bgs) and 44 contained LA ranging from *trace* (defined as 0.2 to 0.8%) to 20%.

- **Removal Activities - August to November 2001.** Stockpiled soils were removed and disposed at the mine, the long shed was demolished, and the concrete slab was abandoned and covered. Additional excavation was conducted along the northern portion of the area adjacent to the river and covered with rip-rap and geotextile. Most of the 52 confirmation soil samples contained LA (<1 to 2%), indicating that contaminated soil remains at varying depths. Samples collected from soil slated for transport to mine. Restoration included placement, compaction, and grading of fill to provide adequate drainage.

- **Removal Activities - August to October 2002.** Focus was on the bank of the lower reach of Rainy Creek and the decontamination pad area. All trees and vegetation were removed along with 18 inches of contaminated soil from side of creek. Of 12 confirmation samples (0 to 2 inches bgs), 2 contained LA (<1%). The pad was removed and two inches of soil were excavated from around the pad area and the area was confirmed as clean (after one small additional removal).

- **Site Restoration Activities - 2002.** Approximately 36 inches of agricultural fill was placed and compacted above the existing common and structural fill placed in 2000 and 2001. Six inches of topsoil was also added. Restoration of roadways was completed using structural fill. Topsoil was placed along the excavated banks of Rainy Creek, followed by revegetation for bank stability and erosion control.

- **Potable Water Well Installation - October 2002 and March and April 2003.** During removals, the original potable water well was damaged and was obstructed at a depth of 41 feet bgs. LA was detected at concentration above the Federal Maximum Contaminant Level of 7 million structures per liter. An attempt was made to drill a replacement well (PW-01) in March. LA was detected in the aquifer materials and in water produced from the alluvial aquifer in which the original well was completed. Sampling results and drilling difficulties resulted in abandonment of the PW-01 borehole and a second borehole. Well PW-01 was eventually completed in the bedrock aquifer to avoid LA, however elevated fluoride prevented its use as a potable water source.

- **Tree Storage Area Sampling - March 2003.** Samples were collected to determine if soil in the root balls of removed trees was contaminated. Samples were collected from the root balls, under the trees (6 to 12 inches bgs), and from burlap wrapped around the roots. No LA was detected.

- **Highway 37 Right-of-Way Removal Activities-September 2003 and August 2004.** Removal activities were performed in 2003 along the west right-of-way, 350 feet south to 270 feet north of the Screening Plant entrance. Of the 10 samples, 2 samples (between about 70 and 270 feet north of the entrance) contained LA (<1%). In 2004, removal activities were performed along a west portion of the right-of-way adjacent to the north portion of the former Screening Plant. Of the seven confirmation soil samples (0 to 2 inches bgs), five contained LA (<1 to 3%).

- **Potable Water Well Installation - July 2005 and May 2006.** Because of elevated fluoride concentrations in PW-01, an additional well (New Well) was completed in the alluvial aquifer. The samples collected during the well installation contained LA (<1%). Eight water samples collected during well development and pumping tests indicated that development was successful in removing asbestos from the formation adjacent to the well. Results from soil cuttings were non-detect (ND) for LA.

2.2.2.2 Flyway Investigation and Removal Activities (Subarea 2)

- **Investigation Sampling - March 2000.** Soil samples were collected (0 to 32 inches bgs) from the main dirt road, known piles of vermiculite, imported fill material piles, and beneath several imported fill material piles. Of the 45 samples collected, 30 contained LA (<1 to 8%).

- **Investigation Sampling - September 2000.** As part of the archeological investigation, test pits were excavated in the northern portion of the Flyway, and soil samples were taken to document possible exposure to the archaeological crew. Only 2 of the 17 samples (from 10 and 64 inches bgs) contained LA (<1%).

- **Investigation Sampling - March 2001.** Exploratory trenching determined the vertical extent of contamination in soil not previously investigated. Of six soil samples collected from trenches in the southern portion of the Flyway (16 to 33 inches bgs), four contained LA (<1 to 2%).

- **Investigation Sampling - May and July 2001.** Of the 43 soil samples collected from the Kootenai River banks in the Flyway (4 to 6 inches bgs), 25 contained LA (<1 to 2%). Of the nine soil samples collected along the southern portion of the eastern Flyway boundary (0 to 4 inches bgs), six contained LA (< 1 %).

- **Removal Activity - September 2001.** Grace's contractor conducted removal under EPA oversight. Soil was excavated from a grid (18 inches bgs). If visible vermiculite or analytical results ≥1% LA were present at the floor of the excavation, an additional 6 inches were to a maximum depth of 4 feet bgs.

Following excavation and soil clearance, the area was restored by backfilling to grade, compacting, and adding 6 inches of topsoil and hydroseeding, as required.

- **Removal Planning – 2002.** The original work plan called for removal of soil with LA ≥1%. However, EPA determined that (until the risk assessment was completed) surface soils having visible vermiculite should be removed to prevent a second mobilization for characterization and removal. Cleanup criteria for subsurface soils remained at 1% LA. All existing sampling data was reevaluated and several grids needed additional characterization to make removal decisions.

- **Investigation Sampling – July 2003.** Additional soil samples were collected along the eastern boundary of the Flyway and the Highway 37 right-of-way from areas not previously investigated. None of the 14 samples collected (0 to 6 inches bgs) contained detectable LA.

- **Removal Activity – July to November 2004.** Contaminated soil was excavated from the Flyway, the northern portion of the property, and the Kootenai riverbank along the southern portion of the property. Iterative removals in lifts were conducted, with a maximum depth of 4 feet bgs. Grids in the river bank slope were excavated to water. Confirmation soil samples were collected from excavation bottoms (0 to 2 inches bgs), and removal was continued until results were acceptable. The excavation was backfilled to grade and hydroseeded.

- **Pre-Removal Investigation Sampling – June 2005.** Because of highway structural integrity and slope stability issues along a portion of a steep bank at the private property and along the Flyway right-of-way, samples were collected to determine if the quantity of soil to be removed could be reduced to protect the roadway. Of 12 soil samples collected (0 to 1 inch bgs), 8 contained LA (<1%).

- **Removal Activity – June 2005.** Contaminated soils on the right-of-way were excavated to 12 inches bgs. A stockpile of contaminated soil was removed. Two confirmation samples had elevated results that could not be addressed through further excavation. Sample 1R-30927 (2% LA at 4 inches bgs) was on a steep embankment of the right-of-way. Sample 1R-30960 (3% at 12 inches bgs) was in the footprint of the stockpile that had been removed and was very near the highway. It was not excavated further due to concerns about impacting the highway's integrity. All excavated areas were restored by backfilling to grade and hydroseeding.

2.2.2.3 Private Property (Subarea 3)

- **Investigation Sampling – April 2000.** Twelve soil samples were collected from suspected vermiculite piles and from native-looking soil (0 to 2 inches, 0 to 6 inches, or 0 to 12 inches bgs). Eight samples from the stockpiles contained LA (2 to 5%) and the remaining samples contained <1% LA.

- **Removal Activity - June 2005.** EPA determined that site soil required removal to a depth of 12 inches throughout the removal area. Confirmation soil samples were collected from the excavation at depths between 2 and 14 inches bgs. Following excavation and confirmation soil sampling, the area was restored in accordance with the work plan by backfilling to grade using materials from a local EPA-approved fill source and hydroseeding as required.

2.2.2.4 Rainy Creek Road Frontages (Subarea 4)

- **Investigation Soil Sampling - May 2003.** Sixteen soil samples (0 to 6 inches bgs) were collected from the Rainy Creek Road Frontages - ten were outside of the defined boundary of the north and south frontage. Fourteen samples contained LA (trace to <1%).

- **Investigation - November 2003.** A confirmation soil sample was collected from the ditch on the north side of the mine road to provide evidence that decontamination run-off water was not re-contaminating the frontages. The sample contained LA at <1%.

- **Removal Activity - August to October 2004.** Twenty-eight soil samples were collected after excavation of contaminated soil from the north and south frontages from a depth of 0 to 2 inches. Most (25 samples) contained LA (<1 and 3%).

- **Quick Response - August 2006.** During a water line repair at the north frontage, a contractor observed vermiculite while excavating a damaged water line. A sample was collected of stockpiled material, and it contained 1% LA. As a result, 40 cubic yards of contaminated soil was excavated.

2.3 Summary of Data Sources and Quality Assurance/Quality Control

Data from numerous sources were used in the RI (EPA 2009a), which formed the basis for the FS (EPA 2009b). EPA conducted site investigations during 1999, 2000, 2001, 2002, 2003, 2006, 2007, and 2008. Investigations during the removal phase were conducted by EPA, Grace, and CDM Federal Programs Corporation (CDM). Investigations during the remedial phase were conducted by CDM and others. These investigations were outlined in Section 2.2.

EPA also conducted other sampling relevant to the RI and FS for OU2. This included the sampling of restoration fill used at Libby. That fill is first tested by EPA to ensure that they are free from organic and inorganic contaminants (above background levels) and meets project-specific physical characteristics. Samples were collected from the backfill used at OU2. Fill material was obtained from the Nixon, Noble, and Plum Creek (Birk) pits in Libby and results indicated that only two samples had detectable concentrations of LA (<1%). The remaining samples were ND. Only fill that was ND was used for restoration.

Additional sampling also included sampling of ambient air. To estimate the human health risk associated with inhalation of LA in outdoor ambient air at the Libby site, an outdoor ambient air monitoring program was designed and implemented. For the purpose of estimating LA concentrations in outdoor ambient air specific to OU2, the two nearest sampling locations were: L15 - 5002 Hwy 37 North (August 2007 to June 2008) and L16 - 4500 Highway 2 West (July 2007 to June 2008). Results of the 34 samples from these locations show that total LA concentrations ranged from ND to 0.00004 s/cc. Only three results exceeded the average concentration observed during the 2006-2008 Libby site ambient air sampling program (0.00001 s/cc).

For work conducted by EPA and its contractors in Libby, quality assurance/quality control (QA/QC) measures include, but are not limited to, the collection of QC samples (such as duplicate samples and field blanks), implementation of a laboratory QA program, review of project reports generated by CDM by an approved QA staff member, and an auditing component to assess the effectiveness of the QA program. All QA/QC components for measurement reports required by EPA Region 8 (i.e., precision, accuracy, representativeness, completeness, and comparability) are addressed in the Draft Quality Assurance and Quality Control Summary Report for the Libby site. Field modifications to the governing documents were approved by EPA and implemented by field staff during activities at OU2. Signed modification forms are located at the CDM Libby office. No negative implications or biases to data have been noted as a result of these modifications.

Data collected at OU2 were evaluated by the EPA (for emergency response data) or government-contracted staff. Data were not validated past that which is required by analytical laboratories' QA/QC program. It is assumed that the raw data were useable for their intended purposes. Each guidance document referenced in this report describes the data quality objectives (DQOs) identified for each data collection activity conducted at OU2 or the Libby site as a whole. Data collected under the 1999 or 2000 Phase 1 Sampling and Quality Assurance Project Plans are under review by the EPA project team as part of the human health risk assessment; however, the general Phase 1 objectives were met. All other work plan-specific DQOs were met.

2.4 Summary of Sampling and Analysis Methods

Various sampling and analysis methods were used to determine the presence of asbestos fibers in different media, such as soil, dust, and air. The following list provides examples of these types of methods that were implemented as part of the remedial activity and risk assessment evaluation at the site:

- **ABS**. This sampling simulates routine activities at the site to estimate potential exposures. Personal air samples are collected from contractors engaged in an activity and the sample analyzed for asbestos fibers using transmission electron microscopy (TEM) analysis.

- **Ambient Air Sampling.** Stationary air monitoring stations are placed in the vicinity or downwind of contaminated areas to collect continuous air samples

using a pump and air filtering cassette. The purpose is to determine the extent of asbestos fiber released from soil. Weather data is collected to correlate climatic conditions with measured releases of fibers. Samples are analyzed for asbestos fibers using TEM analysis.

- **Personal Air Monitoring.** Personal air samples are collected from the breathing zones of participants during various activities. Samples are collected at two flow rates using two different types of pumps during each two-hour event, with a new sample started at the beginning of each new period. Both the high volume and low volume samples are then submitted to the laboratory for analysis using TEM.

- **Polarized light microscopy (PLM) with stereomicroscopy analysis.** Soil samples are analyzed using EPA/600/R-93/116 with a modified protocol that uses a combination of PLM and stereomicroscopy analysis to identify bulk asbestos containing material (ACM) and/or asbestos fibers that may be present in soil.

- **Visual Inspection.** A visual inspection of ACM is completed by first designating inspection areas to establish a boundary around the inspection zone. The soil is then visually inspected for ACM using subsurface excavations or boreholes or surficial visual inspection.

Section 3 Highlights of Community Participation

EPA has implemented a very robust program of community participation at the Libby site. This program began in 2000 and continues today. It goes far beyond the scope of activities typically conducted at a Superfund site. Many of the activities included are listed below. Copies of these materials will be available in the revised Community Engagement Plan for the site in spring 2010.

- Conducted interviews and prepared the Community Involvement Plan (CIP)
- Established a local EPA Information Center and information repository
- Established an on-site community involvement (CI) team
- Provided support to the real estate community
- Provided support and education to stakeholders via classes and workshops
- Supported the Technical Assistance Group (TAG) and Community Advisory Group (CAG)
- Developed a mailing list and prepared and distributed multiple fact sheets
- Published numerous informational advertisements
- Developed and distributed informational brochures, other materials, and a website
- Held numerous public meetings and availability sessions and regularly updated City Council and County Commissioners
- Implemented several targeted informational campaigns
- Issued proposed plans, held a public hearing, and developed responsiveness summaries and RODs for OUs 1 and 2

A brief description of these activities is provided below. A more detailed description is provided in the Community Engagement Plan for the Libby site, which should be available in spring 2010.

3.1 Conducted Interviews and Prepared the CIP

In 2000, EPA conducted community interviews with citizens living on or near the site to find out general information about the properties and information on the property owner's concerns and issues with the site and how best to communicate with the

public. Access and land use information was also gathered during those interviews. Using the information from those interviews, a CIP was prepared and distributed March 2001. Additional interviews were conducted in January 2009, and a Community Engagement Plan is being prepared.

3.2 Established a Local Information Center and an Information Repository

In December 1999, EPA established the EPA Information Center, which is the primary information resource for the Libby community on the project. Located at 108 E. 9th Street, it is a resource for the community and visitors who need information on EPA's work, either in general or as it relates to their property.

The administrative record is housed at the EPA Superfund Records Center in Denver, Colorado. The information repository contains a subset of documents from the administrative record and is located at the EPA's Information Center in Libby. The repository contains basic site information, documents on site activities, technical site documents, and general information about the Superfund program all for public review. Information about the administrative record file and information repository has been included in site fact sheets, so that the general public is aware of the existence and location of the site documents.

3.3 Established an On-site CI Team

A team of on-site CI coordinators (CICs) was established to facilitate interaction between the field team and residents. The CICs are contractors who are responsible for issues that need to be coordinated in order for sampling and cleanups to occur. These include: briefing residents on the scope of work, providing information on temporary relocations, arranging for relocations, facilitating interactions between the field crew and residents, documenting the scope of work and obtaining residential approval, coordinating with residents during relocations, facilitating their return to the property, taking care of all outstanding issues, and ensuring that residents were reimbursed for their costs during relocation. This support is also provided to business owners during cleanup of their properties.

3.4 Provided Support to the Real Estate Community

Libby leaders and the real estate community were concerned that work being done by EPA would slow or stop home sales, make appraisals cumbersome, and make financing more difficult to obtain. In response, EPA developed a multi-phased assistance approach for the real estate community. This includes writing hundreds of "comfort letters" to support real estate transactions. EPA also provided additional information to complete mortgage transactions and arranged for representatives of federal mortgage insurers, lenders, and loan underwriters to attend meetings in Libby. Finally, EPA makes the sampling of properties pending sale a priority, and regularly adjusts schedules to accommodate these requests.

3.5 Provided Education to Stakeholders via Classes and Workshops

EPA has offered a variety of workshops for target audiences that included housing industry representatives (realtors and mortgage lenders) and area contractors. The goal was to ensure that development questions were answered and that contractors knew the issues related to preservation of the integrity of the work conducted to date at the site. EPA set up training classes for area contractors on the subject of asbestos abatement in 2006, 2007, 2008, and 2009. EPA also coordinated multiple stakeholders while putting together two major workshops for (in 2004 and 2006) at the site.

3.6 Provided Support to the TAG and CAG

EPA has funded a TAG in Libby since 2003. In 2004, EPA developed an audience-specific technical workshop aimed at helping TAG members understand the science behind analytical methods and ongoing risk management decisions at the site. This included planning content, presentation materials, travel arrangements, etc. Support also includes advertisement of the meetings each month. EPA has provided meeting support for the monthly CAG since its inception in 2000. This support has included arranging for and paying for the meeting space and a meeting facilitator. Support also includes advertisement of the meetings each month.

3.7 Developed a Site Mailing List and Prepared and Distributed Multiple Fact Sheets

EPA uses a commercially obtained mailing list of all people with mailing addresses within the Libby area zip-code (59263). A new list is purchased about every other year. In addition, a smaller mailing list of stakeholders who are located outside of the Libby area is also maintained (e.g., county, state, and federal elected officials and regulators associated with the site). EPA has prepared and distributed 12 fact sheets to the community about the Site since 2000.

3.8 Published Advertisements

A series of question and answer advertisements have been developed and placed in local newspapers. Entitled *Ask EPA*, these ads provide a question and answer in a concise format. They were originally published biweekly and are now published as needed. To date, over 200 *Ask EPA* ads have been placed. EPA also prepared and placed an advertisement each month to announce the meeting times, places, and dates of the TAG, CAG, and O&M meetings. EPA has used paid advertisements in the form of newspaper columns targeted at specific site issues, from general topics (e.g., what is Superfund) to very specific issues (e.g., cleanups of specific areas). Fifteen columns have been placed in the local newspapers.

3.9 Developed and Distributed Informational Brochures, Written Materials, and a Website

EPA has worked to provide the materials needed to educate and engage the public on the very serious health issues associated with the site. As needs arise, information pieces are designed for a wide variety of audiences. EPA also developed a Libby Superfund website that is user-friendly and presents cleanup information. The website is based in large part on the brochure EPA developed as a community resource. The address for the website is www.epa.gov/libby.

3.10 Held Public Meetings and Availability Sessions and Updated Commissioners

Six public meetings, five joint meetings, two availability sessions, and two listening sessions have been held by EPA since 2004. These meetings are advertised well in advance and at least one was also broadcast simultaneously on the radio. In an effort to improve communication at the site in recent years, EPA has made it a point to regularly provide updates to the City and County Commissioners. These updates are made monthly at the regularly scheduled commission meetings.

3.11 Implemented Targeted Informational Campaigns

EPA has conducted educational efforts targeted at specific upcoming events at the site. The first event was in 2005 and involved a series of advertisements and meetings to provide information on the Superfund process in anticipation of a ROD. The second event was designed to launch the Libby Area ERS position in 2007. The third event was conducted in 2009 to educate the public on the Superfund process and the upcoming release of proposed plans for OUs 1 and 2, public comment period, and issuance of RODs for those OUs. It included the creation and placement of a series of ads depicting the *Road to the ROD*.

3.12 Issued Proposed Plans, Held a Public Hearing, and Developed Responsiveness Summaries and RODs

EPA issued a proposed plan for OU1 on September 7, 2009 and for OU2 on September 14, 2009. These plans were mailed to all residents of the Libby area. A public hearing for the proposed plans was held on September 28, 2009, at which EPA gave a brief presentation and the public had an opportunity to provide oral or written comment. The 30-day comment period was subsequently extended to January 16, 2010.

Section 4 Scope and Role of Operable Unit

The OU2 remedial action will build on the numerous removal actions already implemented at the former Screening Plant and surrounding properties. OUs 1 and 2 are the first of the eight site OUs to have RODs completed. The specific remedial actions that will be taken at OU2 as a result of the ROD are very discrete in scope and will not impact work being done at the remaining OUs.

As described in Section 2, numerous investigations and removal actions have already been completed at OU2. The contamination to be actively addressed in this remedy is limited to two small areas of OU2. The first is a small amount of contaminated shallow soils near sample location 1-03000. The second is a small area of contaminated shallow soils in the west embankment of Highway 37 in the Flyway (Subarea 2). As discussed in Section 2, LA-contaminated soil also remains at depth across many areas of the OU.

The remedy focuses primarily on preventing direct exposure to remaining areas of contamination – either through removal (e.g., the area surrounding sample location 1-03000) or containment (e.g., the west embankment of Highway 37). The remedy also uses engineering controls and ICs both to protect the remedy and to prevent disturbance of the deeper residual LA-contamination. This approach is protective of both human health and the environment.

Certain issues at OU2 of the Libby site will be addressed separately from implementation of the selected remedy. An ecological risk assessment is being developed at the mine site, OU3. Once that work is complete, EPA will build upon information gathered during the risk assessment for OU3 to identify potential pathways and receptors to evaluate ecological risk at the former Export Plant.

Pending completion of the final risk assessment being developed under OUs 4 and 7, EPA is taking action at the former Export Plant now to break exposure pathways. A risk assessment to include activity based sampling, will be conducted following construction of the remedy to verify that exposure pathways have been broken.

In addition, remedial actions that result in hazardous substances, pollutants, or contaminants remaining at a site above levels that allow for unlimited use and unrestricted exposure are required to be reviewed every five years to ensure protection of human health and the environment. EPA is currently engaged in research to derive LA-specific toxicity values. If that research is successful, and LA-specific values are developed, this remedy will be reevaluated to ensure continued protectiveness.

Although EPA does not anticipate the need for any further response action following implementation of this remedy, additional work may be necessary if it is determined

during a five-year review that it is required to ensure protectiveness of human health and the environment.

Section 5 Summary of Site Characteristics

This section contains an overview of the site and the CSM.

5.1 Site Overview

5.1.1 Surface Features and Size

OU2 covers an area of approximately 21 acres. It has five structures/buildings: a privately-owned garage/residential apartment, a pump house, and a gazebo (all constructed in 2004), a 1,500 square foot. log home built in 2009, and an abandoned pump house on the Flyway property. All equipment has been removed from the Flyway pump house, and power has been disconnected. The privately owned garage/residential apartment is accessed periodically by the owners to assess property and equipment stored in the building. The residential apartment is not currently in use.

The entire OU2 property is fenced to prevent access from Highway 37 and the *River Runs Through It* subdivision located immediately south of the OU. The western portion of OU2, along the Kootenai River, is not fenced and portions of the Flyway property have shore line that could be accessible via boat. Riprap was placed along the banks of the Kootenai River within the former Screening Plant subarea to protect the property from flooding and bank erosion. This riprap has also reduced the ease of access to this portion of the OU from the Kootenai River.

5.1.2 Climate

Libby has a relatively moist climate, with annual precipitation in the valley averaging slightly over 20 inches (this includes approximately 60 inches of snowfall). Surrounding higher elevations receive significantly more precipitation. During the winter months, moist Pacific air masses generally dominate, serving to moderate temperatures and bring abundant humidity, rain, and snow. Colder, continental air masses occasionally drop temperatures significantly, but generally only for shorter periods. The average temperatures in December and January are 25 to 30 degrees Fahrenheit (°F).

During summer, the climate is warmer and dryer, with only occasional rain showers and significantly lower humidity and soil moistures. High temperatures of greater than 90 °F are common. The average temperature in July is approximately 65 to 70 °F. Spring and fall are transition periods.

Due to its valley location along the Kootenai River and downstream of the Libby dam, fog is common in the Libby valley. This effect is most pronounced during winter and in the mornings. Inversions, which trap stagnant air in the valley, are also common. Winds in the Libby valley are generally light, averaging approximately 6 to 7 miles per hour. Prevailing winds are from the WNW, but daily wind direction is

significantly affected by temperature differences brought about by the large amount of vertical relief surrounding the area.

5.1.3 Areas of Archeological or Historical Importance

According to the RI (EPA, 2009a), there are no known areas of archeological or historical importance within the disturbed area of the site.

5.1.4 Geology

The mountains surrounding Libby are generally composed of folded, faulted, and metamorphosed blocks of Precambrian sedimentary rocks and minor basaltic intrusions. Primary rock types are meta-sedimentary argillites, quartzites, and marbles.

Excluding vermiculite-related materials that may be present, x-ray diffraction analyses by the United States Geologic Survey of shallow, sub-surface soil from more than ten sites in the Libby area show that it is comprised of major (greater than 20 %) quartz, minor (5-20 %) muscovite (and/or illite) and albitic feldspar, trace (<5%) orthoclase, clinoclore, non-fibrous amphibole (likely magnesiohornblende), calcite, amorphous material (probably organic) and possible pyrite and hematite. Other minerals will be present at levels below 0.5% and are generally not detectable by routine x-ray diffraction analysis. These mineral components represent the average components for the area and will vary to some extent depending on location and history. Surface soil contains the above components with the addition of more organic material.

The vermiculite deposit located at Vermiculite Mountain, the source of LA, is located approximately 7 miles northwest of the town of Libby in the Rainy Creek drainage. The vermiculite deposit specific to the Libby mine is classified as a deposit within a large ultramafic intrusion, such as pyroxenite plutons, which is zoned and cut by syenite or alkalic granite and by carbonatitic rock and pegmatite. The formation of vermiculite and asbestiform amphiboles in the Libby mine deposit, have been assessed to be the result of the alteration of augite by high-temperature silica-rich solutions.

The Vermiculite Mountain deposit is contained within the Rainy Creek alkaline-ultramafic complex. The Rainy Creek complex is described as the upper portion of a hydrothermally altered alkalic igneous complex composed primarily of magnetite pyroxenite, biotite pyroxenite, and biotititie. The original ultramafic body is an intrusion into the Precambrian Belt Series of northwestern Montana with a syenite body southwest of the adjacent to the altered pyroxenite and is associated with numerous syenite dikes that cut the pyroxenites.

5.1.5 Soil

Soil is largely derived from the pre-Cambrian rocks, which break down to form loamy soil composed of sand and silt with minor amounts of clay. The Libby valley area is

somewhat enriched in clays due to its river valley location, and the dense forest of the region contributes organic matter to the soil. Much of the original soil in the area now occupied by the town of Libby has been modified by human activities. These include addition of vermiculite from the Rainy Creek Complex to the soil, reworking of the soil during construction, road building, railroad operations, gardening, processing of vermiculite (i.e., expansion), and other activities. Soil generally varies in color from tan to gray to black.

The US Department of Agriculture National Resources Conservation Services describes much of OU2 as andic dystrochrepts, alluvial terraces. As detailed in Section 2 of the RI report (EPA 2009a), much of the soil at the surface of OU2 is topsoil imported to the site during restoration activities. The surface soil is underlain by stratified alluvial deposits of sand, silt, and gravel (as seen during installation of the potable water well).

5.1.6 Surface Water Hydrology

The Kootenai River, which flows adjacent to the site, has its origins in British Columbia's Kootenay National Park in Canada. From there it flows 485 miles into northwest Montana and through the towns of Libby and Troy. From there it flows into northern Idaho, then back into Canada and Kootenay Lake. Ultimately it joins with the Columbia River. Sixteen miles north of Libby, the river is held back by Libby Dam, creating a 90-mile long reservoir called Lake Koocanusa which reaches into Canada (EPA 2009b).

Rainy Creek flows through the former Screening Plant subarea of the OU. Rainy Creek headwaters form in the Kootenai National Forest, approximately 3 miles north of Vermiculite Mountain (United States Geological Survey 1983). Rainy Creek flows perennially, with discharge into the Kootenai River. The lower reach that flows through OU2 is owned by the State of Montana.

The lower portion of Rainy Creek was restored with several step pools to facilitate fish migration. The records maintained by the Montana Department of Natural Resources and Conservation for ownership of state water rights indicate that the current owners of the former Screening Plant claim provisional water rights to divert surface water from Rainy Creek for irrigation, industrial, and commercial uses. The owners also own the riparian property rights associated with the riparian lands along lower Rainy Creek. It is expected that Rainy Creek will continue to sustain a viable fish population; however, is unknown whether public access to the lower reach will be allowed in the future.

As previously stated, Libby has a relatively moist climate with annual valley precipitation slightly over 20 inches. Higher elevations receive significantly more precipitation and account for much of the creek flow. Seasonal fluctuations cause varying levels of runoff and creek flow. Typically, runoff is most significant in spring when snow at higher elevations begins to melt. Summer precipitation does occur; however, typical summer weather is hot and dry and creek flow is moderated by high elevation lakes.

5.1.7 Hydrogeology

The Libby basin is hydrologically bound to the west by the pre-Cambrian bedrock, to the north by the Kootenai River and to the east by Libby Creek. The southern boundary of the basin extends under the high terrace of glacial lake bed sediments and with the alluvium of Libby Creek.

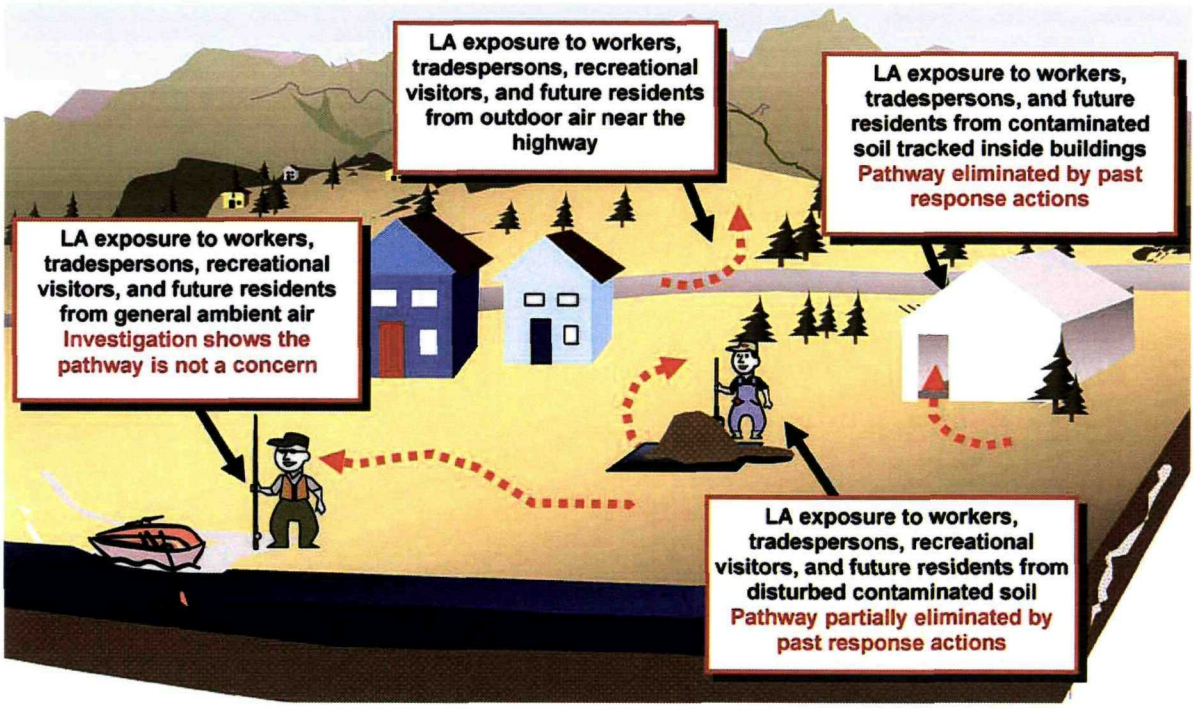
The sediments overlying bedrock in the vicinity of the town of Libby are of glacial, glaciofluvial or alluvial origins. The site stratigraphy is characterized by lenses of interbedded units consisting of gravels, sands, and silty to clayey gravels and sands. These units are the result of numerous episodes of alluvial and glacial erosion and deposition. Types of depositional environments likely to have existed in the Libby area include braided stream, overbank, splay, point bar, till, moraine, outwash, loess (aeolian), channel, and lacustrine. These environments moved in time and space, occurred contemporaneously, cancelled each other out (by erosion) and varied drastically in the level of energy and capacity to sort the available clastic material.

During the installation of the potable water wells within the former Screening Plant subarea, the static groundwater level was observed at 24 feet bgs within the alluvial aquiver that underlies the site.

5.2 Conceptual Site Model

The CSM is a basic description of how contaminants enter the environment, how they are transported, and what routes of exposure to organisms and humans occur. It also provides a framework for assessing risks from contaminants, developing remedial strategies, determining source control requirements, and methods to address unacceptable risks. LA is the dominant environmental concern at the site. A pictorial version of the CSM for current and future receptors at OU2 is depicted in Exhibit 5.1. The traditional flow chart version of the CSM for current and future use is presented in the Section 7 discussion of the risk assessment.

Exhibit 5-1. Summary of Current Status of Exposure Pathways after Past Response Actions



Based on the information presented in the RI report, most contamination at OU2 is located below ground surface. The risk range related to ambient air at OU2 under current conditions is between 5E-08 and 1E-07 (EPA 2009a). However, air data also establish that disturbance of soils that contain vermiculite and LA can lead to the release of LA fibers into air, and this would increase the risk of cancer in any people who were exposed on a regular basis.

Source materials present at OU2 are:

- Vermiculite-containing soil is known to exist in the subsurface and is contained below engineered caps placed during the removal activities. Some vermiculite is known to contain LA.

- The majority of residual contamination is present at depths greater than or equal to 4 feet bgs and in several isolated areas at depths less than 4 feet bgs within the former Screening Plant subarea north of Rainy Creek.

- The majority of the excavated areas within the Flyway met EPA's clearance criteria (<1% LA at depth) at depths varying from less than 1 foot bgs to greater

than 4 feet bgs. However, LA concentrations ≥1% have been detected in confirmation soil samples collected at the eastern boundary of the Flyway within the Highway 37 right-of-way at depths less than 1 foot bgs up to 2 feet bgs. LA was observed in surface soils in one area (area surrounding sample 1-03000) not previously remediated at concentrations of <1%.

- Within the Flyway portion of the Highway 37 right-of-way is an isolated area with concentrations of LA of >1% at less than 1 foot bgs.

- The majority of Subarea 3 does not contain residual contamination; however, one confirmation soil sample collected along the north portion of the property contained <1% LA at a depth of 1 foot bgs.

- Residual contamination is present along the Rainy Creek Road Frontages at a depth between 1 and 2 feet bgs.

5.2.1 Affected Media

Affected media at OU2 are soil and air.

- **Soil.** Soil has been impacted by the migration of contaminants via airborne transport of contaminated dust, runoff of contaminated surface water, or mechanical transportation of source materials.

- **Air.** Ambient air has been impacted in the past by airborne transport of exposed LA contamination in soils and transport of LA from vermiculite processed at the former Screening Plant. Current ambient air concentrations do not show impacts.

5.2.2 Migration Routes and Exposure Pathways

As discussed in Section 2, LA has been observed in all the media sampled at the site (i.e., indoor air, indoor dust, outdoor ambient air, outdoor air near disturbed soil, and soil). However, all complete exposure pathways have either been broken through previously completed removal actions or they have been found to be below levels of concern. The possible exception is the inhalation of outdoor air pathway near disturbed soil in an isolated portion of the Highway 37 right-of-way and the area surrounding sample location 1-03000. Exhibit 5-2 summarizes the status of each exposure pathway within OU2.

Exhibit 5-2. Summary of Current Status of Risks at OU2 after the Interim Remedial Actions

Media/ Exposure Pathway	Status
Outdoor Air Near Highway Adjacent to OU2	Mitigated through interim remedial actions, with the exception of an isolated portion along the Highway 37 right-of-way in the Flyway with >1% LA at <1 foot bgs.
Indoor Air	Mitigated through interim remedial action.
Dust in Air of Vehicles	Pathway is incomplete and believed to negligible when compared to other pathways.
General Ambient Air	Investigation results indicate this pathway is not a concern
Outdoor Air Near Disturbed Soil	Mitigated through removal actions, with the exception of an isolated portion along the Highway 37 right-of-way with >1% LA at <1 foot bgs, and the 10,000 square foot area surrounding sample location 1-03000 with LA at <1%. Both of these locations are within the Flyway.
Inhalation of Dust in Air from Disturbances of Roofing or Other Outdoor Surfaces	Pathway is incomplete and believed to negligible when compared to other pathways.
Soil	Majority of residual contamination is present at depths greater than or equal to 4 feet bgs under engineered cover.

5.2.3 Populations of Concern

Receptors are groups of humans (or other organisms) that could be impacted by site contaminants via one of the exposure pathways. Current potential human receptors at OU2 include commercial workers, tradespersons, recreational visitors, and future residents. The exposure route of chief concern for these receptors is inhalation (breathing) of LA fibers in air.

Section 6 Current and Potential Future Land and Resource Uses

6.1 Land Use

The current and anticipated future land uses for the site are an important consideration for the development of remedial alternatives that are protective of human health and the environment. OU2 is divided into four subareas as shown on Exhibit 2-2 (former Screening Plant, Flyway, Private Property, and Rainy Creek Road Frontage. Of those four subareas, only the former Screening Plant is currently used, all other subareas consist of vacant and undeveloped land with no current plans for future development.

The former Screening Plant subarea is currently privately owned and is being used for residential purposes. It is anticipated and assumed that this subarea will continue to be used for residential and/or commercial purposes. Future land use for the Flyway and Rainy Creek Road Frontage is assumed to be residential and/or commercial.

All subareas include portions of the Highway 37 embankments right-of-way which is maintained by the MDT and is assumed to have non-residential use. Due to steep topography and locations within the right-of-way, it is expected that recreational and commercial use would be limited as well.

The selected remedy employs the use of covers to contain contamination and prevent direct contact, as such covers are one of the primary methods to mitigate or limit the liberation of LA. However, certain activities (e.g., off-road vehicle use) can compromise covers. To limit such activities, ICs or engineered controls are often used to preserve the integrity of the covers and to limit potential exposure risks. The selected remedy specifies the use of such controls, and land uses or activities that would compromise the remedy are considered unacceptable.

6.2 Groundwater Use

OU2 does not address groundwater contamination issues at the site. EPA does not consider groundwater to be a viable pathway for exposure, as asbestos levels at drinking water wells at OU2 are below EPA Maximum Contaminant Levels for asbestos.

6.3 Surface Water Use

Potential impacts to surface water (Rainy Creek and the Kootenai River) will be considered when ecological risk is evaluated. Potential use of Rainy Creek (e.g., for irrigation purposes) will also be addressed in the OU3 ROD.

Section 7 Summary of Site Risks

The RI report contains a human health risk assessment for OU2. The risk assessment uses available data to estimate the health risks to people who may breathe asbestos in air while living on, working at, or visiting OU2, either now or in the future, based on current conditions. Methods used to evaluate human health risk are in basic accord with EPA guidelines for evaluating risks at Superfund sites, including recent guidance that has been specifically developed to support evaluations of exposure and risk from asbestos. The cancer risk estimates described below are based on calculations using the currently available Inventory Update Report for asbestos. As indicated above, EPA is currently engaged in research to derive LA-specific toxicity values. If that research is successful, and LA-specific toxicity values are developed, the risk estimates below will be reevaluated to ensure that remedial decisions are health protective.

Detailed explanations of the steps used to conduct the risk assessment are provided in the RI report, including background information on asbestos, the basis for concern, the exposure model, a toxicity assessment, quantification of exposure and risk, and a listing of uncertainties.

Toxicity values needed for quantification of site-specific cancer risk and non-cancer hazard from inhalation exposure to asbestos are still under development. However, risk estimates based on the best methods and data currently available indicate the following:

- EPA is working to develop a reference concentration that will allow non-cancer exposure hazard for inhalation exposure to LA to be quantified. Therefore, the risk assessment does not include an evaluation of non-cancer hazard. However, studies in Libby imply that the incidence of asbestos-related, non-cancer effects (e.g., pleural calcification, pleural thickening and opacities) may be increased in workers and residents. These findings emphasize that, despite the present inability to provide a quantitative calculation, non-cancer effects may be a significant human health concern in the community. Thus, it should not be presumed that cancer risk is the "risk driver" at OU2 or other parts of the site.

- Results of a 2-year study on ambient air concentrations in and around Libby were evaluated using existing toxicity data for chrysotile asbestos. This assessment indicates that lifetime excess cancer risks to area residents and workers from LA were below EPA's level of concern. The air concentrations are, however, consistent with other areas of the United States where amphibole asbestos is naturally occurring. This assessment will be reevaluated when data are available for site-specific LA toxicity values.

- Most surface soils in OU2 have been remediated, and there are no complete exposure pathways of concern at present in those areas.

- Two locations remain in the Flyway subarea where surface soil is known to be contaminated (an isolated portion of the west embankments of Highway 37 and the area surrounding sample location 1-03000). Also, residual vermiculite and LA remain in subsurface soil in many locations. If contaminated subsurface soil were brought to the surface, human exposure could become a concern at many locations across the OU.

- No data exist to support a quantitative evaluation of potential risks to humans who might disturb contaminated surface soil. However, air sampling data (prior to and during cleanup) at the site indicate that human health risks might be unacceptable if contamination in soil became sufficiently extensive and human exposure was chronic.

- People exposed to LA at OU2 may also be exposed to LA at other locations in and around Libby. While this risk assessment focuses exclusively on exposures and risks that occur within OU2, the contributions of risks from OU2 to total (cumulative) site-wide risk will be addressed in the future.

7.1 Exposure Assessment

7.1.1 Conceptual Site Models

7.1.1.1 Pre-Cleanup Conditions

As discussed in Section 2, historic operations at the Screening Plant and the Flyway led to substantial contamination of OU2 soils with vermiculite and LA. Before the OU was cleaned up by EPA, this contamination may have led to unacceptable human inhalation exposure to LA by a number of alternative pathways, as summarized in the CSM presented in Exhibit 7-1. People who might have been exposed included residents, commercial workers, tradespeople, and recreational visitors (mainly along the river). The exposure pathways of potential concern included:

- **Inhalation of disturbed LA-contaminated soil.** Any disturbance of LA-contaminated outdoor soil (e.g., driving on the soil, digging in the soil, mowing grass or other vegetation, construction activities, etc.) could release LA from the soil into air, especially of the breathing zone of the person engaged in the soil-disturbing activity.

- **Inhalation of disturbed LA-contaminated waste along the highway.** Spillage from trucks hauling mine products and waste may have contaminated soils along the right of way of Highway 37, which passes along the eastern side of OU2. Trucks and cars passing along the highway could cause contaminants to become suspended in air, which could result in exposures of people driving, riding or walking along the highway.

- **Inhalation of disturbed LA-contaminated indoor dust.** People who live or work indoors at the OU may carry LA-contaminated outdoor soil into indoor spaces on shoes of clothing, where the LA would become mixed into indoor dust. Any

indoor activities that disturbed the dust would result in LA being released into the breathing zone of the person performing the activity.

- **Inhalation of general (ambient) outdoor air.** Even if a person is not engaged in any activities that disturb a contaminated source, LA may be released to outdoor ambient air by natural forces such as wind or by disturbances caused by others. This could lead to inhalation exposure simply by breathing outdoor ambient air.

Other pathways that might have been operating in the past include: a) inhalation of contaminated dust (from LA-contaminated soil from OU2) in the interior of vehicles (cars, trucks), and b) inhalation of LA-contaminated dust on roofs or other outdoor surfaces during roof repair or other similar activities.

7.1.1.2 Post-Cleanup Conditions

As discussed in Section 2, because of concerns for current or future exposure of people to the contamination in OU2, EPA has taken extensive actions to clean up the mine-related waste materials and contaminated soils at OU2.

Current Surface Soil Conditions

Surface soils have been remediated over almost the entire area of OU2. Three exceptions include:

- A small area along the river, south of the confluence with Rainy Creek. This area is seasonally submerged. Because any LA contamination that might have existed in this area is expected to either be washed away by the river flow, or else buried beneath sediment deposits, the surface soil in this area is also expected to be free of contamination.

- A larger area along the river in the southern third of OU2. Most of this area is also seasonally submerged, although a narrow portion along the eastern boundary is not. A number of soil samples have been collected along this narrow strip, and all were ND for LA by PLM visual area estimation method (PLM-VE). Based on this, it is concluded that this area is not of concern.

- An area in the southeast corner of OU2, near Highway 37. Surface soils in this area were not remediated because no soil samples collected in the area exceeded the trigger for action ($\geq 1\%$). However, one sample (1-03000) did reveal a low level ($<1\%$) of LA in soil. Based on this, it is concluded that this area could be of potential concern to humans who live or work in the area on a regular basis.

Current Sub-Surface Soil Conditions

Cleanup actions taken at OU2 often involved removing contaminated soils to depths of up to 4 feet. However, there are a number of areas where residual contamination remains below the depth of the excavation.

CSM for Current and Future Exposures

A CSM was prepared to illustrate how people may be exposed to LA at OU2 under current site conditions and in the future (Exhibit 7-1). The key concepts are summarized below:

- In areas that have been remediated and where surface soil is either capped or backfilled with clean soil, there are no complete exposure pathways to LA at present.

- In areas in which the surface has been remediated but residual contamination remains in subsurface soils, if future excavation or construction activities occur, a number of potentially significant exposure pathways might become complete. The potential receptors for residual contamination include: a) tradespersons (excavation workers) during and after the subsurface soil excavation work, and b) on-site residents, workers or visitors to releases from post-construction surface soil contamination.

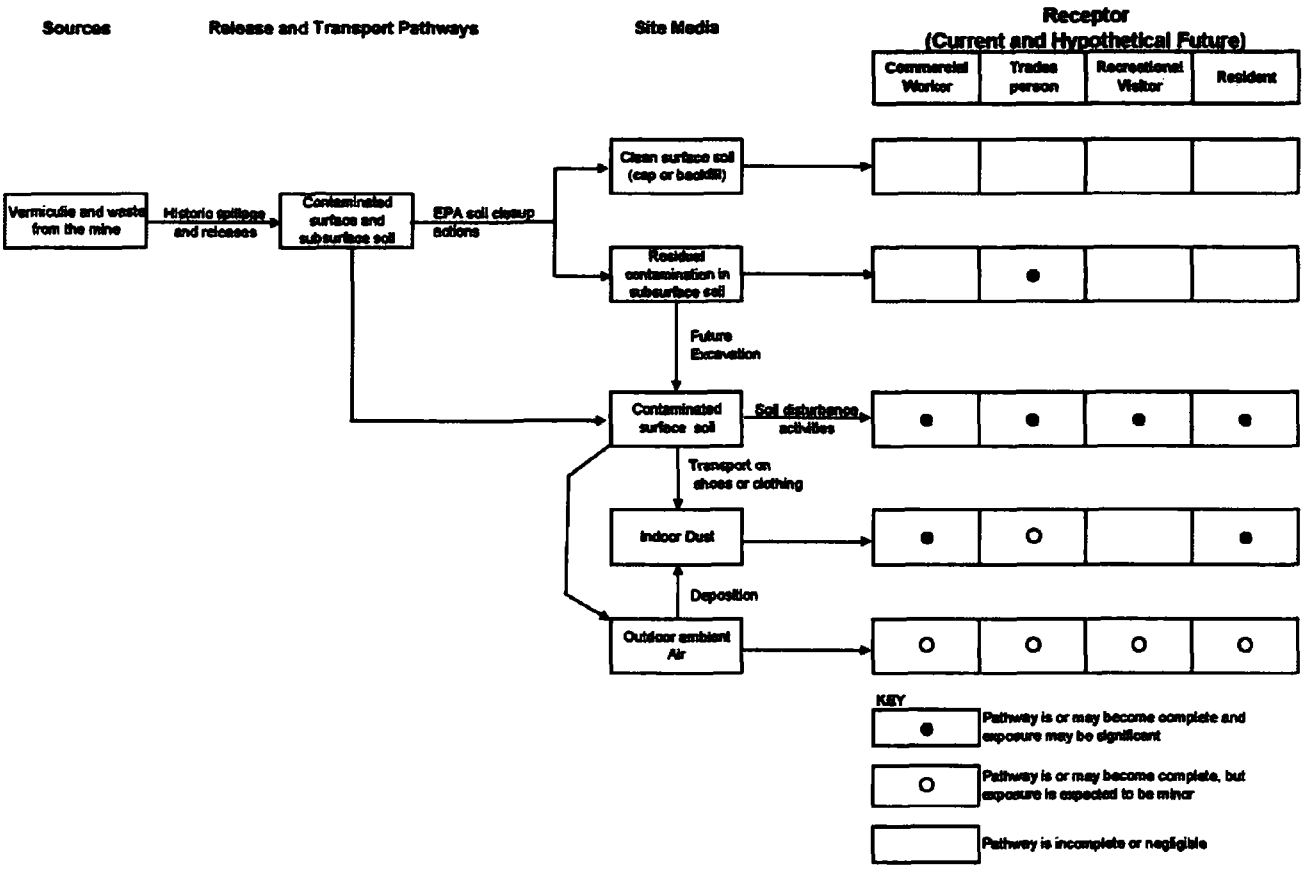
- In areas where surface soil has not been remediated and vermiculite or LA is present, exposures from soil disturbances could be of concern to all receptors.

7.1.2 Quantification of Exposure

Quantification of human exposure to asbestos in air is based on the long-term average concentration level of asbestos in the air that is breathed. Under current site conditions, the only data on LA levels in air that exist are for outdoor ambient air. The estimated level of human health risk from exposure to outdoor ambient air is summarized in Section 7.3.

Data are not available of the levels of LA in air that may result from the disturbance of any remaining areas of surface soil contamination in OU2, or from areas of OU2 that might become contaminated in the future due to excavation activities that could bring residual subsurface contamination to the surface. Consequently, it is not possible to derive any quantitative estimates of the level of human exposures that might ensue from these scenarios.

Exhibit 7-1. CSM for Current and Future Land Use at OU2



7.2 Toxicity Assessment

Toxicity assessments review and summarize the potential for each contaminant of concern to cause adverse effects in exposed populations. Toxic effects generally depend on inherent toxicity; and the magnitude, frequency, and duration of exposure pathways. A toxicity assessment identifies what adverse health effects a chemical causes and how the appearance of these adverse effects depends on the magnitude, frequency, and duration of exposure. Toxicity assessment is usually divided into two parts: non-cancer effects and cancer effects.

The adverse effects of asbestos exposure in humans have been the subject of a large number of studies and publications. The following section provides a brief summary of the main types of adverse health effects that have been observed in humans who have been exposed to asbestos. Sources for more detailed reviews of the literature are provided in the OU2 RI (EPA 2009a).

7.2.1 Non-Cancer Effects

7.2.1.1 Asbestosis

Asbestosis is a disease of the lung that is characterized by the gradual formation of scar tissue in the lung parenchyma. Initially the scarring may be minor and localized within the basal areas, but as the disease develops, the lungs may develop extensive diffuse alveolar and interstitial fibrosis. Build-up of scar tissue in the lung parenchyma results in a loss of normal elasticity in the lung which can lead to the progressive loss of lung function. People with asbestosis tend to have increased difficulty breathing that is often accompanied by coughing or rales. In severe cases, impaired respiratory function can lead to death. Asbestosis generally takes a long time to develop, with a latency period from 10 to 20 years.

7.2.1.2 Pleural Abnormalities

Exposure to asbestos may induce several types of abnormality in the pleura (the membrane surrounding the lungs).

- Pleural effusions are areas where excess fluid accumulates in the pleural space. Most pleural effusions last several months, although they may be recurrent.
- Pleural plaques are acellular collagenous deposits, often with calcification. Pleural plaques are the most common manifestations of asbestos exposure.
- Diffuse pleural thickening is a noncircumscribed fibrous thickening of the visceral pleura with areas of adherence to the parietal pleura. Diffuse thickening may be extensive and cover a whole lobe or even an entire lung.

Pleural abnormalities are generally asymptomatic, although rarely they may be associated with decreased ventilatory capacity, fever, and pain. Severe effects are rare, although severe cases of pleural thickening that led to death have been reported. The latency period for pleural abnormalities is usually about 10 to 40 years, although pleural effusions may occasionally develop as early as one year after first exposure. Specific references for these effects are cited in the OU2 RI.

7.2.1.3 Observations of Asbestos-Related Non-Cancer Diseases in People Exposed to LA

Studies of the cause of death in workers exposed to LA while working at the vermiculite mine and mill at Libby reported that Libby workers were more likely to die of non-malignant respiratory disease (i.e., asbestosis, chronic obstructive pulmonary disease, pneumonia, tuberculosis and emphysema) compared to the general population.

These studies evaluated the prevalence of chest radiographic changes in workers exposed to LA while working at the vermiculite mine and mill at Libby. These researchers observed increased prevalence in pleural changes, including pleural

calcification, pleural thickening and profusion of small opacities among exposed workers. Similar effects were seen for workers exposed to LA at a facility in Ohio that expanded Libby vermiculite for use in lawn care products. An increased incidence of pleural abnormalities was also seen in household contacts of former employees of the Libby mine and residents of Libby. These findings support the conclusion that exposure to LA can induce pleural abnormalities.

7.2.2 Cancer Effects

Many epidemiological studies have reported increased mortality from cancer in asbestos workers, especially from lung cancer and mesothelioma. Based on these findings, and supported by extensive carcinogenicity data from animal studies, EPA has classified asbestos as a known human carcinogen.

7.2.2.1 Lung Cancer

Exposure to asbestos is associated with increased risk of developing all major histological types of lung carcinoma (adenocarcinoma, squamous cell carcinoma, and oat-cell carcinoma). The latency period for lung cancer generally ranges from about 10 to 40 years. Early stages are generally asymptomatic, but as the disease develops, patients may experience coughing, shortness of breath, fatigue, and chest pain. Most lung cancer cases result in death. The risk of developing lung cancer from asbestos exposure is substantially higher in smokers than in non-smokers.

7.2.2.2 Mesothelioma

Mesothelioma is a tumor of the thin membrane that covers and protects the internal organs of the body including the lungs and chest cavity (pleura), and the abdominal cavity (peritoneal). Exposure to asbestos is associated with increased risk of developing mesothelioma. The latency period for mesothelioma is typically around 20 to 40 years; and, by the time symptoms appear, the disease is most often rapidly fatal.

7.2.2.3 Other Cancers

The RI reports that limited evidence exists to suggest that exposure to asbestos may also increase the risk of cancer in several other tissues, including the gastrointestinal tract, the larynx and pharynx, and the kidney.

7.2.2.4 Observations of Asbestos-Related Cancer Cases in Workers in Libby

Studies conducted between the 1980s and present regarding the cause of death in workers exposed to LA while working at the vermiculite mine and mill at Libby reported an increased incidence of lung cancer and mesothelioma in exposed workers, strongly supporting the conclusion that LA can cause increased risk of respiratory cancer when inhaled.

7.2.3 Toxicity Values

At present, although toxicity values have been derived by EPA for chrysotile asbestos, no toxicity values are available specifically for LA. These values are under development and are anticipated to be available for the site-wide human health risk assessment under OU4.

7.3 Characterization of Risk

7.3.1 Risk from Ambient Air

EPA performed a two-year study to characterize the concentration levels of LA in outdoor ambient air in and about the community of Libby in 2006 and 2007 (EPA 2009c). The results indicated that LA levels in outdoor ambient air tended to be higher in summer than other times of year (most likely due to the dry and dusty conditions in late summer). Risk calculations indicated that lifetime excess cancer risks to area residents and workers were below EPA's level of concern.

7.3.2 Risk from Soil Disturbances in Areas of Remediated Soil

In areas where current surface soil consists of a clean cap or clean backfill (Figure 7-1), there are no complete exposure pathways linked to soil, so risks from soil disturbances are not of concern.

7.3.3 Risks from Soil Disturbances in Areas of Current or Potential Future Surface Contamination

A limited volume of surface soils that contained <1% LA (the area surrounding sample 1-030000) were not removed because they did not meet the removal criteria that was in effect during the OU2 removal actions. Because no data exist on the levels of LA in air during soil disturbances in the area of OU2 where current surface soil remains contaminated with vermiculite or LA, it is not possible to derive quantitative risk estimates for humans who might be exposed during soil disturbances in that area. Likewise, it is not possible to derive quantitative risk estimates for exposures that might occur from future soil disturbance activities if excavation or construction activities result in residual subsurface contamination being brought to the surface. However, air data collected in OU2 (before and during cleanup) and in other parts of the Libby site establish that disturbance of soils containing vermiculite and LA can lead to the release of LA fibers into air, and this would increase the risk of cancer in any humans who were regularly exposed.

7.4 Summary of Human Health Risk

Most surface soils in OU2 have been remediated, and in these areas there are no complete exposure pathways of concern at present. However, two areas remain where surface soil is known to be contaminated. These are the area surrounding sample 1-03000 and an isolated portion of the west embankment of Highway 37.

In addition, residual vermiculite and LA are known to remain in subsurface soil in many locations. If contaminated subsurface soil were brought to the surface in the future, human exposure could become a concern at many locations across the OU. Although no data exist to support a quantitative evaluation of potential risks to humans who might disturb contaminated surface soil now or in the future, air sampling data from OU2 (prior to and during cleanup) and from other parts of the site indicate that human health risks might be unacceptable if contamination in soil became sufficiently extensive and human exposure was chronic.

7.5 Ecological Risk

An ecological risk assessment is being developed at the mine site, OU3. Once that work is complete, EPA will build upon information gathered during the risk assessment for OU3 to identify potential pathways and receptors to evaluate ecological risk at OU2.

7.6 Basis of Action

The response actions selected for OU2 in this ROD are necessary to protect the public health and welfare and the environment from actual or threatened releases of hazardous substances into the environment and of pollutants or contaminants that may present an imminent and substantial endangerment to public health or welfare.

Section 8 Remedial Action Objectives and Remedial Goals

8.1 Remedial Action Objectives

This ROD was prepared in accordance with EPA guidelines. The remedy outlined in the ROD is intended to be the remedial action for OU2. Remedial Action Objectives (RAOs) are goals developed by EPA to protect human health and the environment at the Libby site. These are the overarching goals that all cleanup activities selected for OU2 should strive to meet. EPA considers current and future use of the site when determining RAOs.

As described in Section 6, the current and anticipated future land uses for the site are an important consideration for the development of RAOs to ensure remedial alternatives are protective of human health and the environment. Of the four subareas identified at OU2, only the former Screening Plant (Subarea 1) is currently used, all other subareas are undeveloped land with no current plans for future development. Subarea 1 is privately owned and used for residential purposes and it is assumed that this use will continue. The remaining subareas are vacant and undeveloped, and future land use is assumed to be residential and/or commercial. All subareas include Highway 37 embankments maintained by the MDT. Steep terrain on many areas of the site and restrictions placed by MDT are likely to limit recreational and commercial use.

RAOs are media- and source-specific goals to be achieved through completion of a remedy that is protective of human health and the environment. These objectives are typically expressed in terms of the contaminant, the concentration of the contaminant, and the exposure route and receptor. RAOs are typically developed by evaluating several sources of information, including results of the risk assessments and tentatively identified ARARs. These inputs provide the basis for determination of whether protection of human health and the environment is achieved for a remedial alternative.

Based on determinations of human health risks, LA in vermiculite and/or soil is likely to pose a current exposure risk to human receptors through inhalation of fibers released during active soil disturbance activities and inhalation of fibers in outdoor (ambient) air. It is expected that any risk from potential future disturbances that would expose subsurface, LA-containing soil might be substantially higher than under current conditions. Current site conditions are such that surface soils have either been capped or else removed and backfilled with clean soil as per the established removal clearance criteria for the interim remedial action, with the exception of an isolated portion of the Highway 37 right-of-way and area surrounding sample location 1-03000. Both of these locations are within the Flyway.

The RAOs for the site presented below are initially based on anticipated future residential and/or commercial use of the site:

1. Break the exposure pathways for inhalation of LA fibers that would result in unacceptable cancer risk or non-cancer hazard.

2. Control erosion of contaminated soil by wind and water from source locations to prevent exposures and the spread of contamination to unimpacted locations.

3. Implement controls to prevent uses of the site that could pose unacceptable risks to human health or the environment or compromise the remedy.

8.2 Remediation Goals

At a typical federal Superfund site, remedial action is required by EPA when contamination poses cancer risks that exceed 1 in 10,000 (or 1E-04). The RAOs for OU2 address LA contamination that poses cancer risks in the ranges between 1 in 10,000 and 1 in 1,000,000 (1E-06). Remedial goals (RGs) are used to guide such remedial action. RGs are defined as the average concentration of a chemical or a contaminant in an exposure unit associated with a target risk level such that concentrations at or below the RG do not pose an unacceptable risk. However, due to the lack of LA-specific toxicity values, quantitative, risk-based RGs have not yet been developed for OU2, or the remainder of the Site.

RGs would normally be developed by computing the concentration of asbestos in soil that corresponds to an excess cancer risk of 1E-04. However, such a computation is not possible at present because of the lack of LA-specific cancer toxicity values and due to the high variability in the relationship between asbestos in soil and asbestos in air. Even if the computations were possible, the ability to measure asbestos in surface and subsurface soil is presently limited by the available technologies and methods. Additionally, non-cancer risks from inhalation of asbestos fibers have also been recognized, but there are currently no LA-specific non-cancer toxicity values available to quantify non-cancer hazards for LA.

For these reasons, RGs for LA have not been established for site soils. If the RAOs for LA contamination are achieved through implementation of remedial measures mandated by this ROD, then risks to humans from inhalation exposures to LA are expected to be acceptable.

Section 9 Description of Alternatives

This section describes the remedial alternatives developed and evaluated in the FS, including a brief explanation of the alternatives developed for OU2. It is organized into three sections: description of remedy components, common elements and distinguishing features, and expected outcomes.

Remedial alternatives were assembled by combining the retained remedial technologies and process options. Table 9-1 provides a comprehensive list of the remedial technologies/process options that were used to develop each remedial alternative. The fundamental site assumptions and factors were also considered during development of the remedial alternatives.

The remedial alternatives evaluated for OU2 (all four subareas) are:

- Alternative 1: No Action
- Alternative 2: ICs and Engineered Controls with Monitoring
- Alternative 3a: In-Place Containment of Contaminated Soil within the Flyway Subarea, ICs and Engineered Controls with Monitoring
- Alternative 3b: In-Place Containment and Removal of Contaminated Soil within the Flyway Subarea, Offsite Disposal at the Former Libby Vermiculite Mine, ICs and Engineered Controls with Monitoring
- Alternative 4: Removal of Contaminated Soil within the Flyway Subarea, Offsite Disposal at the Former Libby Vermiculite Mine, ICs and Engineered Controls with Monitoring
- Alternative 5: Removal of Contaminated Soil within the Flyway Subarea, Offsite Thermo-Chemical Treatment and Reuse of Treated Material, ICs and Engineered Controls with Monitoring

The following provides general descriptions of these remedial alternatives, as well as the common elements and distinguishing features of the alternatives.

9.1 Description of Remedy Components

Each of the remedial alternatives was evaluated against the screening criteria in the FS. Complete descriptions of each of these alternatives and the results of the screening are provided in the FS (EPA 2009b).

9.1.1 Alternative 1: No Action

A "no action" alternative is required by the NCP to provide an environmental baseline against which impacts of the various remedial alternatives can be compared.

This alternative would discontinue all current remedial activities and no further action would be taken at the site for contaminated soil to address the associated risks to human health or the environment. Five-year site reviews would be performed as required by the NCP to evaluate whether adequate protection of human health and the environment is provided. Monitoring (consisting solely of visual inspections) would be performed as necessary to complete the five-year site reviews.

Exhibit 9-1. Remedy Components Used in OU2 Remedial Alternatives

Remedy Component Used	Remedial Alternative					
	1	2	3a	3b	4	5
In-Place Containment of Contaminated Soil			●	●		
Removal of Contaminated Soil				●	●	●
Offsite Disposal at the Former Libby Vermiculite Mine				●	●	
Offsite Thermo-Chemical Treatment and Reuse of Treated Material						●
ICs and Engineered Controls with Monitoring		●	●	●	●	●
Five-year Review	●	●	●	●	●	●

The shaded alternatives were eliminated from consideration prior to detailed analysis

9.1.2 Alternative 2: ICS and Engineered Controls with Monitoring

Alternative 2 provides protection of human health through ICs (legal and administrative controls) coupled with engineered controls (physical controls such as fencing and signage) to restrict access and use of areas containing residual contaminated soil remaining after the previous remedial actions. Monitoring would be performed to ensure that these controls are protective of human health.

ICs would be implemented to prevent or restrict any activities or uses of the site which could pose a risk to human receptors. Engineered controls would consist of physical barriers, such as fencing along with warning signs, to exclude access to the site and areas with contaminated soil. Engineered controls currently exist at the site to protect covers placed as part of the interim remedial actions. However additional engineered controls would specifically be placed around the two locations within the Flyway Subarea that have identified contamination in surface soils as well as seasonally flooded areas located within Flyway Subarea where presence or absence of

LA contamination is unknown. Monitoring (consisting of inspections) would be performed to determine protectiveness of the remedy after implementation and to ensure that the remedy components are not compromised in the future.

The protectiveness of this alternative would be maintained by conducting each of the following on a periodic basis:

- Long-term O&M would be performed to maintain the integrity of the engineered controls such as fencing and signage. As part of the O&M, ICs would be evaluated and updated if necessary to ensure protectiveness.
- Monitoring (consisting of inspections with sampling and microscopic analysis using methods such as those discussed previously in Section 2.5) would be performed to ensure that protection of human health is maintained for areas outside of the fenced areas.
- Five-year site reviews would be performed since contaminated soil is left in place, preventing unrestricted use of the site.

9.1.3 Alternative 3a: In-Place Containment of Contaminated Soil within the Flyway Subarea, ICs and Engineered Controls with Monitoring

Alternative 3a provides protection of human health through in-place containment (protective covers) to address risks to human receptors from contaminated soil within two isolated locations of the Flyway subarea. These two locations include the west embankment of Highway 37 and the area surrounding sample location 1-03000. ICs coupled with engineered controls as described for Alternative 2 would also be implemented to restrict access and use of areas containing residual contaminated soil remaining after the interim and final remedial actions, including the seasonally flooded areas located within Flyway Subarea where presence or absence of LA contamination is unknown.

Protective covers used for in-place containment are assumed to be constructed from clean soil transported from an offsite borrow source outside of Libby valley tested for contamination. This assumption would be refined at the time of remedial design.

ICs would be provided to prevent or restrict any activities or uses of the entire site which could pose a risk to human receptors and to protect the remedy (protective covers) put in place during interim remedial actions and as part of this alternative.

Engineered controls consisting of physical barriers (fencing) along with warning signs currently exist at the site to protect covers placed as part of the interim remedial actions. Additional engineered controls would also be placed to exclude access to the seasonally flooded areas located within Flyway Subarea. Monitoring would be performed as described for Alternative 2.

The protectiveness of this alternative would be maintained by conducting each of the following on a periodic basis:

- Long-term O&M would be performed to maintain the integrity of the engineered controls and protective covers. As part of the O&M, ICs would be evaluated and updated if necessary to ensure protectiveness.

- Monitoring (consisting of inspections such as those discussed previously in Section 2.5) would be performed to ensure that the integrity of the remedy components (protective covers) placed at the site are intact and that protection of human health is maintained within the site.

- Five-year site reviews would be performed since contaminated subsurface soil is left in place below the protective covers, preventing unrestricted use of the site.

9.1.4 Alternative 3b: In-Place Containment and Removal of Contaminated Soil within the Flyway Subarea, Offsite Disposal at the Former Libby Vermiculite Mine, ICs and Engineered Controls with Monitoring

Alternative 3b provides protection of human health through in-place containment (protective covers) as well as removal and offsite disposal to address risks to human receptors from contaminated soil within two isolated locations of the Flyway subarea. These two locations include the west embankment of Highway 37 and the area surrounding sample location 1-03000. The location within the west embankment of Highway 37 would be contained in-place using protective covers and the location surrounding sample location 1-03000 would be excavated along with offsite disposal of contaminated soil. ICs coupled with engineered controls as described for Alternative 3a would also be implemented to restrict access and use of areas containing residual contaminated soil remaining after the interim and final remedial actions, including the seasonally flooded areas located within the Flyway Subarea where presence or absence of LA contamination is unknown.

Protective covers used for in-place containment are assumed to be constructed from clean soil transported from an offsite borrow source outside of Libby valley tested for contamination. Removal of contaminated soil would be conducted to an assumed depth of 12 inches bgs. Removed soil would be transported offsite and placed within the former Libby vermiculite mine. Removal areas are assumed to be backfilled using clean soil. Clean soil used to backfill removal areas would be transported from an offsite borrow source outside of the Libby valley tested for contamination. These assumptions regarding in-place containment as well as removal and offsite disposal would be refined at the time of remedial design.

ICs and engineered controls and monitoring would be performed similarly as discussed above for Alternative 3a. The protectiveness of this alternative would be maintained by conducting each of the following on a periodic basis:

- Long-term O&M would be performed to maintain the integrity of the engineered controls and protective covers. As part of the O&M, ICs would be evaluated and updated if necessary to ensure protectiveness.

- Monitoring (consisting of inspections such as those discussed previously in Section 2.5) would be performed to ensure that the integrity of the remedy components (protective covers and backfilled excavations) placed at the site are intact and that protection of human health is maintained within the site.

- Five-year site reviews would be performed since contaminated subsurface soil is left in place below the protective covers and backfilled excavations, preventing unrestricted use of the site.

9.1.5 Alternative 4: Removal of Contaminated Soil within the Flyway Subarea, Offsite Disposal at the Former Libby Vermiculite Mine, ICs and Engineered Controls with Monitoring

Alternative 4 provides protection of human health primarily through removal (excavation). Removal would be used to address risks to human receptors from contaminated soil within two isolated locations of the Flyway subarea. These two locations include the west embankment of Highway 37 and the area surrounding sample location 1-03000. ICS coupled with engineered controls as described for Alternative 3b would also be implemented to restrict access and use of areas containing residual contaminated soil remaining after the interim and final remedial actions, including the seasonally flooded areas located within the Flyway Subarea where presence or absence of LA contamination is unknown.

Removal of contaminated soil would be conducted to an assumed depth of 12 inches bgs. Removed soil would be transported offsite and placed within the former Libby vermiculite mine. Removal areas are assumed to be backfilled using clean soil. Clean soil used to backfill removal areas would be transported from an offsite borrow source outside of the Libby valley tested for contamination. These assumptions would be refined at the time of remedial design.

ICs and engineered controls as well as monitoring would be performed similarly as discussed above for Alternative 3b. The protectiveness of this alternative would be maintained by conducting each of the following on a periodic basis:

- Long-term O&M would be performed to maintain the integrity of the engineered controls, protective covers, and backfilled excavations. As part of the O&M, ICs would be evaluated and updated if necessary to ensure protectiveness.

- Monitoring (consisting of inspections such as those discussed previously in Section 2.5) would be performed to ensure that the integrity of the remedy

components (protective covers and backfilled excavations) placed at the site are intact and that protection of human health is maintained within the site.

- Five-year site reviews would be performed since contaminated subsurface soil is left in place below the protective covers and backfilled excavations, preventing unrestricted use of the site.

9.1.6 Alternative 5: Removal of Contaminated Soil within the Flyway Subarea, Offsite Thermo-Chemical Treatment and Reuse of Treated Material, ICs and Engineered Controls with Monitoring

Alternative 5 provides protection of human health primarily through removal (excavation) and treatment of the removed contaminated soil at an offsite facility that demineralizes asbestos fibers using thermo-chemical conversion to address risks to human receptors from the contaminated surface soil within two isolated locations of the Flyway subarea. These two locations include the west embankment of Highway 37 and the area surrounding sample location 1-03000. ICs coupled with engineered controls as described for Alternative 4 would also be implemented to restrict access and use of areas containing residual contaminated soil remaining after the interim and final remedial actions, including the seasonally flooded areas located within the Flyway Subarea where presence or absence of LA contamination is unknown.

Removal of soil would be conducted to an assumed depth of 12 inches bgs. Removed soil would be transported to a permitted offsite treatment facility to undergo thermo-chemical conversion (TCCT). TCCT, patented by ARI, is a commercial form of this technology. Contaminated soil would be mixed with proprietary demineralizing agents within a hydrofluoric acid solution. The mixture is then heated in a rotary hearth furnace. The resulting reaction product (rock-like material) is an inert material that is not fibrous like asbestos. Although studies have been performed by ARI to support this assertion, the technology is relatively new so extensive sets of data are not available to confirm long-term irreversibility of the treatment process.

The treated inert material would then be transported back to the site and used as backfill material for the removal areas on the site. Clean soil from an offsite borrow source outside of the Libby valley tested for contamination would be used to supplement inert backfill material derived from the treatment process. These assumptions would be refined at the time of remedial design.

ICs and engineered controls and monitoring would be performed similarly as discussed above for Alternative 4. The protectiveness of this alternative would be maintained by conducting each of the following on a periodic basis:

- Long-term O&M would be performed to maintain the integrity of the engineered controls, protective covers, and backfilled excavations. As part of O&M, ICs would be evaluated and updated if necessary to ensure protectiveness.

- Monitoring (consisting of inspections such as those discussed previously in Section 2.5) would be performed to ensure that the integrity of the remedy components (protective covers and backfilled excavations) at the site are intact and that protection of human health is maintained within the site.

- Five-year site reviews would be performed since contaminated subsurface soil is left in place below the protective covers and backfilled excavations, preventing unrestricted use of the site.

9.2 Common Elements and Distinguishing Features of Each Alternative

Common elements and distinguishing features in how the remaining LA contaminated soils at OU2 are addressed under remedial alternatives 1, 2, 3a, 3b, 4, and 5 are discussed below and summarized in Exhibit 9-1.

9.2.1 Contaminant Removal

Three of the alternatives (3b, 4, and 5) include the use of excavation of contaminated shallow soils. Alternative 3b uses excavation only to address the small area of near surface contamination surrounding sample location 1-03000. Alternatives 4 and 5 excavate the area surrounding sample location 1-03000 *and* the contamination in the west embankment of Highway 37 (Flyaway Subarea).

9.2.2 Covers

Alternatives 3a and 3b are the only alternatives that use covers. The covers are used in the west embankment of Highway 37 (Flyaway Subarea) to contain near surface contamination without potentially impacting the stability of the highway and to prevent direct exposure to that contamination.

9.2.3 Off-Site Disposal

Of the four alternatives that include excavation of contaminated soils, Alternatives 3b and 4 are the only ones to use off-site disposal. Contaminated soils excavated under Alternative 3a are disposed on site, and those excavated under Alterative 5 are treated off-site and then returned for use as backfill.

9.2.4 Off-Site Treatment Technology

Alternative 5 is the only alternative that employs an off-site treatment technology to address contamination. The shallow contamination surrounding sample location 1-03000 and in the west embankment of Highway 37 (Flyaway Subarea) would be excavated, transported off-site for thermo-chemical treatment, and then returned to the site for use as backfill.

9.2.5 ICs and Engineering Controls with Monitoring

All alternatives (except Alternative 1) use ICs and engineering controls to prevent any unauthorized disturbance of subsoil that could result in exposure to LA-contaminated soils. Alternative 2 uses these controls as the primary component of the remedy to prevent or restrict any activities or uses of the site which could pose a risk to human receptors through contact with the remaining surface contamination at the OU. Alternatives 3a and 3b use these controls to protect the integrity of covers placed over surface contamination in the west embankment of Highway 37.

Long-term O&M is used for all alternatives (except Alternative 1) to ensure the controls are functioning as planned. As part of O&M, the controls would be evaluated and updated if necessary to ensure protectiveness.

9.2.6 Five-Year Reviews

For all alternatives, contaminated subsurface soil is left in place – either because it is not addressed (Alternative 1), is addressed only through ICs or engineering controls (Alternative 2), or is left in place below protective covers (Alternatives 3a and 3b) or backfilled excavations (Alternatives 3b, 4, and 5). Therefore, unrestricted use of the OU is not allowed and all alternatives require the use of five-year site reviews.

Section 10 Comparative Analysis of Alternatives

Each alternative was evaluated in the FS to determine its overall effectiveness, implementability, and cost. Remedial alternatives deemed to have lower than moderate effectiveness, lower than moderate implementability, and/or high cost were eliminated from further consideration. Those alternatives were Alternatives 4 and 5. The remaining alternatives (1, 2, 3a, and 3b) were retained for detailed analysis against the two threshold criteria and five balancing criteria in the FS. The results of the detailed analysis (Exhibit 10-1) allow a comparative analysis of the alternatives and identify the key tradeoffs between them.

A comparative analysis for the remedial alternatives against the threshold and balancing criteria is described below. Only significant comparative differences between alternatives are presented. The full set of rationale for the qualitative ratings is provided in the FS. A discussion of the modifying criteria is provided in Section 10.3.

10.1 Threshold Criteria

10.1.1 Overall Protection of Human Health and the Environment

Of the four retained alternatives, only the "no action" alternative (i.e. Alternative 1) fails to provide protection for human health and the environment and did not address the RAOs for contaminated soil. Thus, this alternative was given a rating of "none."

Alternative 2 addresses the RAOs for contaminated soil through engineered controls and ICs to prevent contact with contaminated soil posing potential human health risks. Monitoring would be performed to ensure that the remedy components provide protection of human health after the remedy is put in place. However, contaminated soil still remains on site (below the covers placed during interim remedial action and on the surface at two locations within the Flyway Subarea) and could pose exposure risks if the remedy components are compromised. Thus this alternative was given a rating of "moderate."

Alternative 3a addresses the RAOs for contaminated soil. Apart from engineered controls and ICs; additional in-place containment using soil covers on the west embankments of Highway 37 and the area surrounding sample 1-03000 within the Flyway Subarea would be used to prevent contact with contaminated soil posing potential human health risks. Monitoring would be performed to ensure that the remedy components provide protection of human health after the remedy is put in place. Contaminated soil still remains on site and could pose exposure risks if the remedy components are compromised. For this alternative, soil covers are placed over the two isolated locations within the Flyway subarea which comprise a very small area as compared to the overall site. While there would be some additional benefits to the long-term effectiveness and permanence of these isolated areas, there are also additional short-term impacts to workers and from implementing this remedy. The

primary remedy components for the site as a whole are the ICs, engineered controls, and monitoring. Thus there is no significant additional increase in the overall protection of human health and the environment over Alternative 2. Therefore, this alternative was also given a rating of "moderate."

Alternative 3b addresses the RAOs for contaminated soil. Apart from engineered controls and ICs; additional in-place containment using soil covers on the Highway 37 west embankments and limited removal (excavation) of area surrounding sample 1-03000 within the Flyway Subarea to prevent contact with contaminated soil posing potential human health risks. Monitoring would be performed to ensure that the remedy components provide protection of human health after the remedy is put in place. Contaminated soil still remains on site and could pose exposure risks if the remedy components are compromised. For this alternative, the active cleanup is performed over the three isolated areas within the Flyway subarea which comprise a very small area as compared to the overall site. Thus there is no significant additional increase in the overall protection of human health and the environment. Therefore, this alternative was also given a rating of "moderate."

10.1.2 Compliance with ARARs

Alternative 1 fails to be compliant with the chemical-specific ARARs identified for the site since no action is taken. Thus, this alternative was given a rating of "none."

Alternatives 2, 3a, and 3b would address the chemical-, location, and action-specific ARARs through adherence of the ARARs during implementation of the remedial action. Based on the current assumptions, compliance with the potential ARAR of NESHAP 40 CFR Part 61 Subpart M regarding cover construction and engineered controls would be met by using the provision contained in 40 CFR 61.151(c).

However, it is unknown whether asbestos contamination exists within soil in the seasonally flooded areas of the Flyway Subarea. If asbestos contamination in soil is present, it may cause periodic exceedances of chemical-specific ARARs if there was wind dispersion of asbestos fibers to air during dry periods or migration of fibers to surface water during flooding. Thus, Alternatives 2 and 3 were given a rating of "moderate to high."

Exhibit 10-1. Summary of Comparative Analysis of Alternatives for OU2

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3a	Alternative 3b
Overall protection of human health and the environment	⓪ Not protective and does not meet RAOs.	❸ Protective of human health and the environment and meets RAOs; however contamination would remain in subsurface soil beneath protective covers, preventing unrestricted site use.		
Compliance with ARARs	⓪ Not compliant.	❹ Compliant with ARARs.		
Long-term effectiveness and permanence	⓪ Does not address soil contamination.	❸ Long-term effective remedy using existing protective covers. ICs and engineered controls and monitoring to be implemented to protect remedy. Contamination remaining in subsurface soil under protective covers restricts use.	❹ Similar to Alt. 2; however provides additional protection to human receptors from contaminated soil within the Flyway Subarea through in-place containment (protective covers).	❹ Similar to Alt. 3a; however provides additional protection to human receptors from contaminated soil within the Flyway Subarea through a combination of in-place containment (protective covers) as well as removal (excavation) and offsite disposal.
Reduction of toxicity, mobility, or volume through treatment	⓪ Provides no treatment; therefore, does not provide for reduction of toxicity, mobility, or volume of contaminants through treatment.			
Short-term effectiveness	⓪ Does not address soil contamination.	❹ Limited amount of surface soils would be disturbed for installation of engineered controls. Dust suppression, air monitoring, and personal protective equipment (PPE) help mitigate risks to workers.	❸ Similar to Alt. 2; but more surface soil to be disturbed in cover placement. Traffic control needed due proximity to Hwy 37. Dust suppression, air monitoring, and PPE needed. Hauling of clean soil potentially impacts community.	❸ Similar to Alt. 3a; but a slightly more surface soil to be disturbed during cover placement and soil removal. Traffic control, dust suppression, air monitoring, and PPE required. Hauling of clean and contaminated soil potentially impacts community.
Implementability	❺ Easily implemented because no action is taken other than five-year site reviews.	❸ Uses standard construction and materials for engineered controls. Construction in seasonally flooded areas could be difficult. ICs could be challenging due to some private ownership. Monitoring easily implemented.	❸ Similar to Alt. 2; but additional cover would be placed in the Flyway. Logistics for cover construction in Hwy 37 right-of-way should not significantly impact implementability over Alt. 2.	❸ Similar to Alt. 3a; but a combination of cover and removal/offsite disposal would be performed in Flyway. Logistics for cover construction in Hwy 37 right-of-way and offsite disposal should not significantly impact implementability over Alts. 2 or 3a.
Present Value Cost ($)	$ $104,000	$$$ $623,000	$$$ $681,000	$$$ $695,000

Note:
The detailed analysis of retained alternatives involves a qualitative assessment of the degree to which remedial alternatives address evaluation criteria presented in the FS along with detailed cost spreadsheets (cost summaries, present value analyses, and cost worksheets) for qualitative assessment.

Threshold and Balancing Criteria: ⓪ **None,** ❶ **Low,** ❷ **Low to Moderate,** ❸ **Moderate,** ❹ **Moderate to High,** ❺ **High**

Balancing Criteria Present Value Cost in $: ⓪ None, $ Low ($0 through $250K), $$ Low to Moderate ($250K through $500K), $$$ Moderate ($500K through $1M), $$$$ Moderate to High ($1M through $1.5M), $$$$$ High (Greater than $1.5M)

10.2 Balancing Criteria

10.2.1 Long-Term Effectiveness and Permanence

Alternative 1 fails to provide long-term effectiveness and permanence since no action is taken. Thus, this alternative was given a rating of "none."

Alternative 2 provides protection of human health through engineered controls and ICs to prevent contact with contaminated soil posing potential human health risks. Monitoring would be performed to ensure that the remedy components provide protection of human health onsite. Since asbestos contamination remains within surface soil in the Flyway Subarea and in subsurface soil beneath covers constructed at the site, persons could be exposed to the contaminated soil if the integrity of previously constructed covers or engineered controls is compromised. Long-term effectiveness and permanence is not certain, thus this alternative was given a rating of "moderate."

Alternative 3a provides slightly higher long-term effectiveness and permanence by in-place containment of contaminated soil within the west embankments of Highway 37 and the area surrounding sample 1-03000 in the Flyway Subarea, which is otherwise left exposed under Alternative 2. While Alternative 3a relies on ICs and engineered controls and monitoring for long-term effectiveness, permanence of this alternative is slightly better than Alternative 2 since contaminated surface soil within the Flyway subarea is also contained in-place. Thus, this alternative was given a rating of "moderate to high."

Alternative 3b uses the same remedial strategy as Alternative 3a, apart from removal and offsite disposal of contaminated soil within the area surrounding sample 1-03000. Other than this localized area that would be excavated, the overall long-term effectiveness and permanence is similar to Alternative 3a. Thus, this alternative was also given a rating of "moderate to high."

10.2.2 Reduction of Toxicity, Mobility, or Volume through Treatment

All of the retained alternatives fail to provide a reduction of toxicity, mobility, or volume through treatment since treatment is not a component of these alternatives. Thus, all of the retained alternatives were given a rating of "none."

10.2.3 Short-Term Effectiveness

Alternative 1 fails to provide short-term effectiveness since no action is taken. Thus, this alternative was given a rating of "none." Alternative 2 addresses the short-term risks to workers, the community, and the environment. Engineered controls (fencing and signage) could be quickly implemented to address potential exposure by the community to contaminated soil. ICs would also be implemented to prevent uses that could pose risks to human health as well as protect the remedy components put in place during interim remedial actions as well as this alternative. Duration of construction (engineered controls) would be short with minimal disturbance of the

soil within the site. Short-term risks to workers would be mitigated through the use of safety measures such as water-based dust suppression and personal protective equipment (PPE). Thus, this alternative was given a rating of "moderate to high."

Alternative 3a also addresses the short-term risks to workers, the community, and the environment. ICs and engineered controls could be quickly implemented similarly to Alternative 2 to address potential exposure by the community to contaminated soil. Apart from construction of engineered controls, Alternative 3a would include in-place containment of contaminated soils within the west embankments of Highway 37 and the area surrounding sample 1-03000 of the Flyway Subarea. Since this alternative includes placement of covers within the right-of-way of Highway 37, there are potential impacts to the community such as lane closures, which could affect safety of the traveling public. Short-term risks to workers would be mitigated through the use of safety measures such as water-based dust suppression and PPE. Since this alternative also involves greater disturbance of contaminated soil than for Alternative 2, it poses additional risks to workers and the community that have to be mitigated. Thus, this alternative was given a rating of "moderate."

Alternative 3b uses the same remedial strategy as Alternative 3a to addresses the short-term risks to workers, the community, and the environment. The primary difference between this alternative and Alternative 3a is the removal and offsite disposal of excavated contaminated soil which could potentially increase the risk of exposure to workers and the community. However the excavation volume requiring offsite disposal is relatively small and the off-site disposal haul route from the Flyway subarea only travels public roads for a very short distance. Thus, this alternative has minimal additional risks to workers and the community when compared to Alternative 3a. Thus, this alternative was also given a rating of "moderate."

10.2.4 Implementability

Alternative 1 has no action taken other than five-year site reviews, which can be readily implemented. Thus, this alternative was given a rating of high.

Alternative 2 requires construction of engineered controls around the seasonally flooded areas within the Flyway Subarea. The construction resources and materials needed to construct the fencing for this alternative should be easily available and construction and maintenance of the fencing will occur during periods of seasonal low water levels on the Kootenai River. Maintenance of the covered areas and monitoring would be relatively easy. ICs could be challenging for the site since some of the property is under private ownership. Thus, this alternative was given a rating of "moderate."

Alternative 3a has similar ICs and engineered controls as well as monitoring components as Alternative 2. However, Alternative 3a also requires in-place containment of contaminated soil using covers over two isolated areas within the west embankments of Highway 37 and the area surrounding sample 1-03000. The construction resources and materials needed to construct the covers for this

alternative should be available. Maintenance of the covered areas, engineered controls and monitoring would be relatively easy. While there would be some logistical concerns and approvals required from State of Montana agencies during construction of covers within the right-of-way of Highway 37, the required soil cover construction comprises a very small area and it is anticipated that it can be performed without significant adverse impacts to the implementability of this Alternative. Thus, this alternative was given a rating of "moderate."

Alternative 3b has similar ICs and engineered controls as well as monitoring components as Alternative 3a. Apart from in-place containment of contaminated soils within the west embankments of Highway 37, this alternative also requires removal and offsite disposal of contaminated soil from the area surrounding sample 1-03000. Under the alternative there is an overall decrease in volume of clean soil imported from alternative 3a, but this alternative also requires offsite hauling of excavated contaminated soil. Disposal of the excavated soil off site would require approvals from State of Montana agencies. However it is anticipated that offsite disposal can be performed without any significant adverse impacts to the implementability when compared to Alternatives 3a. Thus, this alternative was also given a rating of "moderate."

10.2.5 Cost

Present value costs for all alternatives were evaluated over a 30-year period (Years 1 through 30). The present value cost for Alternative 1 was given a rating of "low." The present value cost for this alternative is approximately $104,000. The present value cost for Alternative 2 was given a rating of "moderate." The present value cost for this alternative is approximately $623,000. The present value cost for Alternative 3a was given a rating of "moderate." The present value cost for this alternative is approximately $681,000. The present value cost for Alternative 3b was given a rating of "moderate." The present value cost for this alternative is approximately $695,000.

10.3Modifying Criteria

The final criteria for evaluation of the alternatives are state and public acceptance. These criteria were applied after review of the input received during the public comment period for EPA's proposed plan for clean up at OU2. The comment period was open from September 7, 2009 through January 16, 2010. Submissions were made by individuals or groups. Four of the submissions were specific to OU1, six submissions were specific to OU2, and nine submissions addressed both OU1 and OU2. A synopsis of the comments received and EPA's responses to them is provided in the Responsiveness Summary (Part 3 of this document). The following summarizes the overall nature of the comments relevant to OU2 and how the modifying criteria affected the remedy.

10.3.1 State Acceptance

Representatives of MDEQ provided input in the RI, FS, proposed plan, and ROD through review of these documents. Their comments were incorporated before the documents were released to the public. The State of Montana, through the MDEQ, supports EPA's preferred alternative for remediation of OU2.

In their comments to EPA, MDEQ indicated that they supported EPA's proposed plan, including the preferred alternative detailed therein. MDEQ did provide several comments, which are addressed in the Responsiveness Summary. They include: a concern about EPA's use of visible vermiculite as a clean-up standard and as a trigger for additional investigation/remediation for OU1, a desire to document that the selected remedy will break all exposure pathways to be protective until a quantitative risk assessment is performed and cleanup levels are established, a desire to have ICs specified in as much detail as possible in the remedial design, and a desire to limit risk to less that 1x10-5.

EPA provided explanation and clarification for these comments in the Responsiveness Summary. However, no modification of the selected remedy was necessary as a result of these comments.

10.3.2 Public Acceptance

The City of Libby, the City-County Board of Health for Lincoln County, and the CAG submitted public comments indicating that they preferred not taking action until a final cumulative risk assessment is available but were accepting of the selected remedy as an interim decision for OU2. Their comments focused primarily on the need for EPA to work with local government during remedial design and action, concerns about risk, and concerns about the ongoing effectiveness and protectiveness of the remedy.

Public comments were also received from two citizens groups (via one comment letter) that indicated their opposition to the preferred alternative presented in the proposed plan. These comments focused on the lack of contaminant-specific information needed for risk assessment which they believe makes the ROD premature, concern about analytical detection levels, questions about the boundaries and scope of the cleanup, concerns about the completeness and long-term effectiveness of the remedy, and questions about current exposures in Libby.

10.3.3 Modifications Made as a Result of Comment

As with the comments from the State of Montana, comments from the general public were addressed through clarification and explanation. Based on these comments and the general tone of discourse in public meetings held to date, EPA has made a number of changes to the original proposal, including:

- **Risk Assessment.** EPA will conduct a quantitative, site-wide risk assessment, to include ABS, at OU2 following the completion of construction (once toxicity values are available) to confirm effectiveness of the remedy.

- **New Information**. When the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c). If unacceptable exposures are identified, EPA will take action, as necessary, to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs. In addition, EPA will conduct five-year reviews as part of the ongoing O&M of the remedy.

- **Removal of Contamination at Depth in Excavations**. If LA source materials are encountered during excavation activities, removal will continue until the source material is removed (to a maximum of 3 feet). If contamination continues below 3 feet, a visible barrier marking the extent of excavation will be placed before backfilling.

- **Engineered Controls**. The need for engineered controls (e.g., fences and/or warning signs) will be evaluated during the remedial design process. Through additional sampling of the seasonally flooded areas.

- **Right-of-Way Excavation**. The possibility of excavating rather than covering the contamination on the Highway 37 right-of-way will be evaluated during the remedial design process to determine if highway stability impacts will make excavation impossible or cost-prohibitive.

Section 11 Principal Threat Wastes

Principal threat wastes are source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present significant risk to human health or the environment should exposure occur.

The LA contaminated soil and LA waste at OU2 is considered a principal threat waste. This material is the source for LA and acts as a source for direct exposure when these materials are encountered. As such, the waste would present a significant risk to human health should exposure occur.

The selected remedy will eliminate the exposure to the source materials by removing the waste (in surface soils near sample location 1-03000) or by breaking the exposure pathway associated with disturbance of the source materials by in-place containment (contaminated soil within the west embankment of Highway 37). ICs will provide assurance that the integrity of the remedy will be protected. While the NCP establishes an expectation that EPA will use treatment to address any principal threat waste, the use for treatment technologies for asbestos containing soils is cost prohibitive for the site.

Section 12 Selected Remedy

Based on consideration of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements, the detailed analysis of remedial alternatives, state comments, and all public comments (see Part 3, Responsiveness Summary), EPA has determined that the preferred remedial alternative presented in the proposed plan for OU2 (*Alternative 3b, In-Place Containment and Removal of Contaminated Soil within the Flyway Subarea, Offsite Disposal, ICs and Engineered Controls with Monitoring*) is the appropriate remedy for OU2. The selected remedy includes components to address contaminant sources. A description of the selected remedy is presented below.

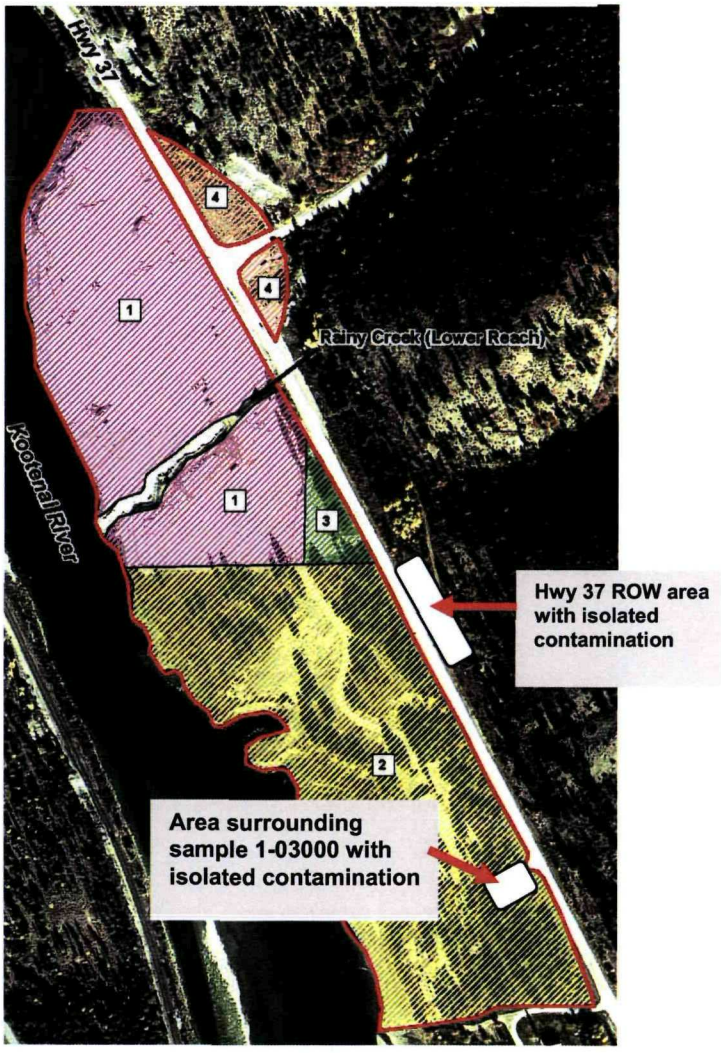
12.1 Short Description of the Selected Remedy

The selected remedy described in this ROD is a removal and containment remedy that addresses protectiveness across the entire OU. However, as the majority of OU2 has already been remediated under past response actions, the work left to be completed is limited to two small remaining areas of contamination within the upper 18 inches of soil at the OU.

The first area is a small area surrounding a single contaminated sample location (1-03000) (Exhibit 12-1). That area of contamination will be excavated and disposed off site.

The second area of accessible contamination to be addressed by the selected remedy is a small area along the embankment of Highway 37 that could not be excavated in prior actions due to concerns that the excavation could damage the structural integrity of the highway. At present, it is assumed that that area cannot be excavated due to those stability concerns, so a protective cover will be placed over the

Exhibit 12-1. Areas to be Addressed in Remedy



contamination to prevent exposure. However, during the remedial design process, further evaluation of highway stability impacts will be conducted to determine if excavation is possible.

The selected remedy reduces the long-term risk of exposure to LA at the OU by eliminating complete exposure pathways. This ensures that residents, commercial workers, and low-intensity users have limited opportunities for inhalation of LA from contaminated OU2 soil, thus reducing cancer risk and non-cancer hazard from LA exposure. The selected remedy also reduces risks to terrestrial ecological receptors through control of LA.

ICs will be used to minimize risks posed to human receptors from remaining LA in soils and also to ensure that covers are not damaged. The controls may allow residential, commercial, and recreational land use, but will limit uses that might damage the remedy. EPA anticipates that the ICs will include governmental, proprietary, and informational controls such as community awareness programs (e.g., ads, handouts, contractor training, EPA Information Center, ERS program). If engineered controls are needed, they would likely include posted warnings and fencing. The need for engineering controls will be evaluated in the remedial design process.

Additionally, EPA will conduct a review to evaluate effectiveness of the remedy, as soon as sufficient new information concerning toxicity factors is available. If unacceptable exposures are identified, EPA will take action as necessary to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs. EPA will also conduct a risk assessment at OU2, once toxicity factors are available, to confirm effectiveness of the remedy.

12.2 Rationale for the Selected Remedy

The selected remedy provides the best balance of tradeoffs among the alternatives and attains an equal or higher level of achievement of the threshold and balancing criteria than other site-wide alternatives that were evaluated. It achieves substantial risk reduction and is feasible, implementable, and has long-term cost-effectiveness. Residual risks are effectively eliminated, mitigated, or managed under the selected remedy. The successful performance of the remedy is confirmed by past experience with removal and covering of contaminant sources at the site. Further rationale for the selected remedy is provided below.

12.3 Detailed Description of the Selected Remedy

As discussed earlier, the selected remedy provides protection of human health by addressing two isolated areas of accessible contaminated soil in the Flyway. The remedy also maintains and protects remedies put in place under past response actions. Details of the selected remedy are provided below. They may be modified in the remedial design and construction processes. Such a modification may include a decision to excavate, rather than contain, the near surface contamination in the

Highway 37 right-of-way if stability evaluations conducted in the design process indicate it is feasible and not cost-prohibitive.

When the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c). If unacceptable exposures are identified, EPA will take action as necessary to ensure that the soil-to-air pathway is broken. Actions may include additional excavation (to a maximum of 3 feet), improving covers, and/or strengthening ICs. If contamination continues below 3 feet, a visible barrier marking the extent of excavation will be placed before backfilling. EPA will also conduct a risk assessment at OU2, once toxicity factors are available, to confirm effectiveness of the remedy.

12.4Removal and Containment

Removal and offsite disposal of contaminated materials will be used in the area surrounding sample location 1-03000. Approximately 10,000 square feet of surface area will be removed, with excavations going as deep as 18 inches below ground surface. A visible marker layer will be placed at the bottom of the excavation to denote the extent of the cleanup and approximately 400 cubic yards of loose fill will be used for backfill.

EPA currently intends to use in-place containment (protective covers) in two small areas of the Highway 37 west embankment (approximately 5,000 square feet). As mentioned previously, the current understanding of these areas is that they cannot be excavated because of the potential for damage to the structural integrity of Highway 37. However, during the remedial design process, further evaluation of highway stability impacts will be conducted to determine if excavation is possible. If excavation is possible and not cost-prohibitive, it will be used instead of containment.

If removal is not possible, EPA will proceed with containment. A soil cover will be used because of ease of installation, availability of borrow soil resources, and affordability compared to other types of covers (e.g., geosynthetic or concrete/asphalt). The cover thickness and materials used will be refined in the remedial design process. The area to be covered encompasses approximately 5,000 square feet of surface area. The cover will be seeded to minimize erosion. A visible marker layer will be placed at the bottom of the cover to denote the extent of cleanup.

Clean fill for excavations and construction of covers will be obtained from offsite subsoil and topsoil sources outside of the Libby valley (used for the ongoing Libby cleanup efforts). During construction, water-based dust suppression would likely be used to prevent asbestos fibers from becoming airborne. Chemicals could be used as an alternative to water, if necessary.

12.4.1 ICs

ICs, or land use restrictions, are often placed on properties to limit activities that could compromise the integrity of the remedy. ICs such as restrictive covenants,

zoning ordinances, easements, deed restrictions, and public information serve to limit use of reclaimed areas to acceptable activities or guide behavior to avoid exposures that may exceed health-based levels. ICs also provide for an orderly transfer of land usage, such as when open space lands may be proposed for commercial or industrial use. Additionally, ICs provide for the proper transfer of ownership so that land restrictions are clear when ownership changes. The controls may allow residential, commercial, and recreational land use, but will limit uses that might create an exposure pathway or damage the remedy.

EPA anticipates that an important IC at OU2 could involve an agreement with a one-call utility locate service such as U-Dig. U-Dig is a local service that people call at no cost before digging at their property to locate underground hazards (e.g., electrical lines). U-Dig could add "known areas of subsurface vermiculite at OU2" to their database of underground hazards using information provided by EPA. Advice on how to address the contamination, if disturbance is required, would be obtained from the ERS. The ERS is a position currently staffed in Libby by EPA which may be transitioned to another government entity when remedial action across the site is complete. In addition to providing advice and instruction, the ERS will manage any contamination encountered. Additional informational devices include the EPA Information, ad, handouts, and contractor training classes Specific details will be developed in the remedial design process.

Proprietary restrictions will also be considered and might include an environmental covenant, easement, or deed notice. EPA will work closely with the MDEQ, the City of Libby, MDT, and the City and County Board of Health in the remedial design process to ensure that the controls selected will be implementable and will achieve the desired results. ICs are considered an integral part of the remedy, so development and implementation of the ICs will be conducted as part of the remedial action. Response actions are funded through a settlement with Grace.

The need for engineered controls (e.g., fences and/or warning signs) will be evaluated during the remedial design process. It is possible that fencing may be needed to ensure protectiveness of the seasonally flooded areas. Additional sampling conducted during remedial design will address this possibility.

12.4.2 Operations and Maintenance

Long-term O&M will be required to maintain the integrity of the engineered controls, backfilled areas, and covers, including covers placed during previous response actions and as part of this remedy. Monitoring will be used to ensure these controls are protective.

12.5 Estimated Cost of the Selected Remedy

As discussed in Section 10, present value cost for Alternative 3b is approximately $695,000. The estimated capital costs are $338,000 and O&M and five-year review costs (for the first 30 years) are $984,000. The construction timeframe is estimated to

be less than one construction season (May to October). Exhibit 12-2 presents the cost estimate summary for the selected remedy, including the present value analysis on a year by year basis.

12.6 Expected Outcomes of the Selected Remedy

The selected remedy will achieve acceptable exposure risks through a combination of removal and containment. The remedy is expected to address the most significant contaminant sources. Risks to human health from inhalation of contaminated media will be eliminated or reduced. Exposure to contaminated media remaining will be controlled by limiting access and use of ICs and engineering controls to address potential future uses.

The majority of the OU is privately owned and the selected remedy will allow it to continue to be used for residential and commercial purposes. The former Screening Plant subarea is currently privately owned and is being used for residential purposes. All four subareas at the OU include portions of the Highway 37 embankments right-of-way which is maintained by the MDT and is assumed to have non-residential use. Due to steep topography and locations within the right-of-way, it is expected that recreational and commercial use would be limited as well.

The selected remedy employs the use of covers to contain contamination and prevent direct contact. Because certain activities (e.g., off-road vehicle use) can compromise covers, ICs or engineered controls will be used to limit those activities thereby preserving the integrity of the covers and limiting potential exposure.

12.7Performance Standards

Current analytical capabilities are insufficient to adequately characterize concentrations of LA in soil, particularly at concentrations of less than 0.2%. Additionally, there is not an established relationship between concentrations of LA in soil and concentrations of LA in air. Given these analytical constraints, the performance standard will be based on an estimate of risk calculated for the soil-to-air exposure pathway following implementation of the remedy. That risk will be estimated using air samples collected during activity based sampling for both workers and visitors to the property who may disturb soil. The acceptable risk range is between 1E-04 to 1E-06.

Exhibit 12-2. Cost Estimate Summary for Selected Remedy

Year[1]	Capital Costs	Capital Costs (Earthwork)	Annual O&M Costs	Periodic Costs	Total Annual Expenditure[2]	Present Value[3]
0	$0	$0	$0	$0	$0	$0
1	$190,000	$148,000	$0	$0	$338,000	$315,895
2	$0	$0	$24,000	$0	$24,000	$20,962
3	$0	$0	$24,000	$0	$24,000	$19,591
4	$0	$0	$24,000	$0	$24,000	$18,310
5	$0	$0	$24,000	$48,000	$72,000	$51,336
6	$0	$0	$24,000	$0	$24,000	$15,991
7	$0	$0	$24,000	$0	$24,000	$14,945
8	$0	$0	$24,000	$0	$24,000	$13,968
9	$0	$0	$24,000	$0	$24,000	$13,054
10	$0	$0	$24,000	$48,000	$72,000	$36,598
11	$0	$0	$24,000	$0	$24,000	$11,402
12	$0	$0	$24,000	$0	$24,000	$10,656
13	$0	$0	$24,000	$0	$24,000	$9,960
14	$0	$0	$24,000	$0	$24,000	$9,307
15	$0	$0	$24,000	$48,000	$72,000	$26,093
16	$0	$0	$24,000	$0	$24,000	$8,129
17	$0	$0	$24,000	$0	$24,000	$7,598
18	$0	$0	$24,000	$0	$24,000	$7,102
19	$0	$0	$24,000	$0	$24,000	$6,636
20	$0	$0	$24,000	$48,000	$72,000	$18,605
21	$0	$0	$24,000	$0	$24,000	$5,796
22	$0	$0	$24,000	$0	$24,000	$5,417
23	$0	$0	$24,000	$0	$24,000	$5,062
24	$0	$0	$24,000	$0	$24,000	$4,730
25	$0	$0	$24,000	$48,000	$72,000	$13,262
26	$0	$0	$24,000	$0	$24,000	$4,133
27	$0	$0	$24,000	$0	$24,000	$3,862
28	$0	$0	$24,000	$0	$24,000	$3,610
29	$0	$0	$24,000	$0	$24,000	$3,374
30	$0	$0	$24,000	$48,000	$72,000	$9,461
TOTALS:	$190,000	$148,000	$696,000	$288,000	$1,322,000	$694,845
TOTAL PRESENT VALUE OF ALTERNATIVE 3b[4]						**$695,000**

Notes:
1 Duration is assumed to be 30 years for present value analysis.
2 Total annual expenditure is the total cost per year with no discounting.
3 Present value is the total cost per year including a 7.0% discount factor for that year.
4 Total present value is rounded to the nearest $1,000. Inflation and depreciation are excluded from present value cost.
Costs presented are expected to have accuracy between -30% to +50% of actual costs, based on the scope. They are prepared solely to facilitate relative comparisons between alternatives for FS evaluation.

Section 13 Statutory Determinations

Under CERCLA Section 121 and the NCP, EPA must select a remedy that is protective of human health and the environment, complies with or appropriately waives ARARs, is cost effective, and utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that include treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element. The following sections discuss how the selected remedy meets these statutory requirements.

13.1 Protection of Human Health and the Environment

The selected remedy includes components to address human health and environmental risks associated with residual LA at OU2. Unacceptable human health or environmental risks will be addressed. The selected remedy will be monitored and maintained through comprehensive programs using ICs, engineered controls, monitoring, and maintenance. There are no short-term threats associated with the selected remedy that cannot be readily controlled through applicable health and safety requirements, monitoring, and standard construction practices. In addition, no adverse cross-media impacts are expected from the selected remedy.

The selected remedy will protect human health and the environment through consolidation and covering to eliminate a complete exposure pathway for inhalation at the OU. Engineering controls will effectively isolate LA in soils and will prevent human and environmental exposures. Protection will be maintained via a comprehensive O&M plan. ICs and engineered controls will be implemented to ensure that the remedy is not disturbed inappropriately.

13.2 Compliance with ARARs

ARARs are determined based on analysis of which requirements are applicable or relevant and appropriate to the distinctive set of circumstances and actions contemplated at a specific site. The NCP requires that ARARs be attained during the implementation and at completion of the remedial action. A summary of federal and state ARARs for the OU2 ROD is attached as Appendix A.

The selected remedy would address the chemical-, location, and action-specific ARARs through adherence of those ARARs during implementation of the remedial action. As discussed in Section 10.2, there is a potential for LA contamination within the seasonally flooded areas of the Flyway Subarea which could potentially cause periodic exceedances of chemical-specific ARARs under certain conditions. The overall rating for the selected remedy on compliance with ARARs is "moderate to high." Exhibit 13-1 presents the evaluation criteria considerations and the justification for the rating.

Exhibit 13-1. Evaluation of Compliance with ARARs for Selected Remedy

Evaluation Criteria Considerations for Compliance with ARARs	Justification for Rating
Compliance with Chemical-Specific ARARs	■ Contaminated surface soil contained in-place with covers along with removal of contaminated soil and offsite disposal coupled with backfilled excavations would physically address contaminant sources and prevent discharges of asbestos fibers to air, thus meeting visible emissions requirements of NESHAP and chemical-specific ARARs for air. ■ ICs and engineered controls do not physically address migration of site contamination; presence of unaddressed contaminated soil may not be compliant with NESHAP and could cause exceedances of chemical-specific ARARs in air.
Compliance with Location-Specific ARARs	■ Addressed during implementation of the remedial action.
Compliance with Action-Specific ARARs	■ Addressed during implementation of the remedial action. Specifically, as per EPA's determination the cover and signage and fencing requirements specified under NESHAP (40 CFR 61.151) are a potential consideration as a relevant and appropriate ARARs for the site and would be in compliance with this ARAR as allowed under 40 CFR 61.151(c) and 40 CFR 61.151(b), respectively.

13.2.1 Contaminant Sources

No permits will be necessary to implement a remedial action within the site boundary of OU2 in accordance with Section 121(e) of CERCLA; however, the substantive requirements of the permits will be followed.

13.2.2 Surface Water

The State of Montana has promulgated specific water quality standards applicable to the use designation of the Kootenai River. Montana's non-degradation standard applies.

Stormwater discharge best management practices (BMPs) will be implemented during construction, as needed. The BMPs will allow the surface water ARARs to be met. This will require adherence to the substantive requirements of the general stormwater permits for certain activities and refer to the requirement of BMPs to minimize or prevent discharge that may adversely affect human health or the environment. As noted in Section 7.5, an ecological risk assessment is being developed at OU3. EPA will build upon that information to identify potential exposure pathways and receptors to evaluate ecological risk at OU2.

13.2.3Other ARARs

Several federal location-specific ARARs are applicable to OU2 and will be met by the selected remedy through consultation with the appropriate state and federal agencies and other resources. These ARARs include a variety of acts designed to protect endangered species, bald eagles, and migratory birds and encourage historic, archeological, and antiquities preservation. EPA will involve the U.S. Fish and Wildlife Service and historical preservation agencies in remedial design to ensure compliance with these ARARs.

Federal and state standards for air[1] are both contaminant and action-specific ARARs at OU2. These standards are applicable to releases of particulate matter during remediation. EPA anticipates that these ARARs can be met through the implementation of appropriate standard operating procedures and monitoring.

13.3 Cost Effectiveness

In EPA's judgment, the selected remedy is cost effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost effective if its costs are proportional to its overall effectiveness" [NCP §300.430(f)(1)(ii)(D)]. This was accomplished by evaluating the overall effectiveness of the selected remedy and comparing that effectiveness to the overall costs. Effectiveness was evaluated by examining how the remedy meets three criteria: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume; and short-term effectiveness. Overall effectiveness of the remedial alternatives was then compared to costs to determine cost effectiveness.

Often, more than one cleanup alternative is cost effective and Superfund does not mandate the selection of the *most* cost-effective cleanup alternative. This is because the most cost-effective remedy does not always provide the best balance of tradeoffs with respect to remedy selection criteria nor is it necessarily the least costly alternative that is both protective of human health and the environment *and* ARAR compliant.

For OU2, net present value costs for each alternative were compared in the FS, and a range of costs for each alternative was developed that represents the range and possible scope of actions. The cost of the selected remedy is expected to be $695,000. EPA believes that the selected remedy achieves an appropriate balance between cost effectiveness and adequate protectiveness.

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[1] Federal Clean Air Act(40 CFR 50.6) and Clean Air Act of MT (ARM 17.8.233)

13.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

This determination looks at whether the selected remedy provides the best balance of trade-offs among the alternatives with respect to the balancing criteria set forth in NCP §300.430(f)(1)(i)(B), such that it represents the maximum extent to which permanence and treatment can be practicably utilized at this site. NCP §300.430(f)(1)(ii)(E) provides that the balancing shall emphasize the factors of "long-term effectiveness" and "reduction of toxicity, mobility, or volume through treatment," and shall consider the preference for treatment and bias against offsite disposal. The modifying criteria were also considered in making this determination.

The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a cost-effective manner at OU2. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the selected remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and bias against offsite treatment and disposal, and considering state and community acceptance.

The volume of remaining contamination in the upper 18 inches of the OU is too small for treatment to be a viable option from a cost perspective. Treatment of soils adjacent to the highway would also likely present the same issues with structural integrity of the roadbed that are associated with excavation in that area. Thus, active treatment was screened out and long-term effectiveness is achieved through maintenance, monitoring, and engineered controls. The selected remedy is expected to provide short-term effectiveness with a low level of risk to the community, cleanup workers, and the environment. It is also highly implementable.

13.5 Preference for Treatment as a Principal Element

Treatment does not constitute a major component of the remedy for OU2 and the selected remedy does not satisfy the statutory preference for treatment as a principal element. Although EPA has an expectation for treatment whenever principle threat wastes are present on a site (as at OU2), treatment is not a viable option at OU2 for the reasons presented in Section 13.4.

13.6 Five-Year Reviews

Because the selected remedy results in contaminants remaining on site (although under covers) above levels that allow for unlimited use and unrestricted exposure (based on what is currently known), a statutory review will be conducted pursuant to CERCLA §121(c) and NCP §300.430(f)(5)(iii)(C). EPA shall conduct a review of remedial actions no less often than each five years after the initiation of such remedial action to assure that the remedy is, or will be, protective of human health and the environment.

The five-year reviews will include any additional information related to human health or ecological risk that is developed during the period covered by the review. If unacceptable exposures are identified, EPA will take action as necessary to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs. EPA will also conduct a risk assessment at OU2, once toxicity factors are available, to confirm effectiveness of the remedy.

When the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c). Although EPA does not anticipate further remedial action following implementation of this remedy, additional work may be conducted as necessary to ensure protectiveness.

Section 14 Documentation of Significant Changes

The proposed plan for OU2 was released for public comment in September 2009. It identified Alternative 3b as the preferred alternative. That alternative is described herein as the selected remedy. The public comment period was extended to 120 days, and EPA reviewed all written and verbal comments submitted during that comment period. It was determined that no significant changes to the remedy, as originally identified in the proposed plan, were necessary.

The following points of clarification were made:

- **Risk Assessment.** EPA will conduct a quantitative, site-wide risk assessment, to include ABS, at OU2 following the completion of construction (once toxicity values are available) to confirm effectiveness of the remedy.

- **New Information**. When the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c). If unacceptable exposures are identified, EPA will take action, as necessary, to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs. In addition, EPA will conduct five-year reviews as part of the ongoing O&M of the remedy.

- **Removal of Contamination at Depth in Excavations**. If LA source materials are encountered during excavation activities, removal will continue until the source material is removed (to a maximum of 3 feet). If contamination continues below 3 feet, a visible barrier marking the extent of excavation will be placed before backfilling.

- **Engineered Controls**. The need for engineered controls (e.g., fences and/or warning signs) will be evaluated during the remedial design process. Through additional sampling of the seasonally flooded areas.

- **Right-of-Way Excavation**. The possibility of excavating rather than covering the contamination on the Highway 37 right-of-way will be evaluated during the remedial design process to determine if highway stability impacts will make excavation impossible or cost-prohibitive.

Section 15 References

Ecology and Environment, 2005, El Dorado Hills Naturally Occurring Asbestos Multimedia Exposure Assessment, Preliminary Assessment and Site Inspection Report

EPA 2009a, Final Remedial Investigation Report, Operable Unit 2 - Former Screening Plant and Surrounding Properties, Libby Asbestos Site, Libby, Montana, prepared for EPA by CDM Federal Programs Corporation.

_____ 2009b, Final Feasibility Study Report Operable Unit 2 - Former Screening Plant and Surrounding Properties, Libby Asbestos Site, Libby, Montana, prepared for the EPA by CDM Federal Programs Corporation.

_____ 2009c, Summary of Outdoor Ambient Air Monitoring for Asbestos at the Libby Asbestos Site, Libby, Montana. (October 2006 to June 2008). Report prepared by US EPA, Region 8, with Technical Assistance from Syracuse Research Group, Inc. February 9, 2009.

RECORD OF DECISION

FOR

LIBBY ASBESTOS SUPERFUND SITE

THE FORMER SCREENING PLANT

OPERABLE UNIT 2

LINCOLN COUNTY, MONTANA

Part 3
Responsiveness Summary

Section 1 Introduction

Based on the RI for OU2, EPA believes it is prudent to move forward and take remedial action to reduce exposure and protect public health. Removal and/or capping of contaminated soil mitigates potential current and future human exposure pathways that contribute to an unacceptable risk at these locations. EPA recognizes there are uncertainties with the proposed plan, but believes the public health benefit outweighs the alternative of taking no action at this time.

EPA continues to study the effects of LA contamination on human health and the environment. While these important investigations are underway, current findings show that it is necessary to move forward with a remedy at OU2 to mitigate continued exposure to asbestos.

The most significant human exposure pathway of concern is inhalation of asbestos from contaminated soil that may become airborne as the soil is disturbed. The selected remedy uses proven techniques (removal and capping) to break the soil-to-air pathway. Breaking the pathway will result in significantly reduced exposure to LA. In addition to breaking exposure pathways from surface soil, the selected remedy will also ensure that potentially contaminated subsurface soil will be managed to prevent further exposure, if it is disturbed in the future.

EPA believes it is important to proceed with a comprehensive remedy to protect human health from known exposure to LA. This remedy will address both surface and subsurface soil. This approach will also provide ICs and define maintenance requirements for any contamination left in place.

ICs will be used to minimize risk to people from any potential remaining contamination. They will also serve to ensure that the remedy is not damaged. The ICs may allow residential, commercial, and recreational land use, but will limit uses that might compromise the remedy. Long-term maintenance of the backfilled areas and covers, including covers placed during previous response actions, will be required. Monitoring will be used to ensure the ICs are protective into the future.

To confirm the effectiveness of the selected remedy, EPA will conduct a risk assessment following construction of the remedy once the necessary toxicity values have been developed. The risk assessment will include ABS to measure the soil to air exposures addressed by the remedy. ABS will include an evaluation of potential exposure to workers and exposure scenarios representative of potential future land use.

As important as it is to take action now to prevent continued exposure, EPA also recognizes the importance of incorporating new information as our knowledge about the effects of LA grows through further study. EPA will review the protectiveness of the remedy no less often than every five years. If unacceptable exposures are identified during this five-year review process (or in the interim), EPA will take action as necessary

to ensure that the soil-to-air pathway is broken. Actions may include additional excavation, improving covers, and/or strengthening ICs. In addition, when the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c).

Section 2 Responses to Specific Comments

The public comment period for EPA's proposed remedy at OU2 was open from September 7, 2009 through January 16, 2010. Seventeen individuals or groups submitted comments. (One group sent two comment letters, and one individual sent two comment letters for a total of nineteen distinct submissions.) Four of the submissions were specific to the Export Plant (OU1), nine submissions addressed both OU1 and OU2, and six addressed OU2 only. Comments on OU1 will be addressed in the Responsiveness Summary to this ROD for OU1.

Each comment (or a synopsis of each) relevant to OU2 is numbered and italicized below, followed by EPA's response. For the full text of each comment, please visit www.epa.gov/libby.

2.1 Comments in Favor of the Preferred Alternative

The State of Montana, through the MDEQ, a local organization of community leaders, and one individual support EPA's preferred alternative for remediation of the OU2.

1) ***Comment.*** *Visible vermiculite is neither an appropriate, nor an accurate, method of quantifying the concentration of Libby amphibole in the potentially impacted soil and is not a valid cleanup standard for this ROD.*

   EPA Response. EPA agrees that observation of visible vermiculite is not an accurate method of quantifying the concentration of LA in the potentially affected soil. Please refer to Section 8.2 of this ROD for a discussion on remediation goals.

2) ***Comment.*** *MDEQ does not support using the presence of visible vermiculite to trigger remedial actions.*

   EPA Response. For action levels and clearance criteria, EPA will continue to use the protocols developed in the "*Libby Asbestos Site Residential/ Commercial Cleanup Action Level and Clearance Criteria Technical Memorandum,*" dated December 2003.

   In areas to be excavated and backfilled, EPA will remove up to 18 inches of contaminated soil. EPA will also continue to excavate and remove any material that appears to be vermiculite, processed ore, or material associated with vermiculite mining/milling or processing operations to a maximum depth of 3 feet. If contamination continues below 3 feet, a visible marker will be placed at the bottom of the excavation to denote the extent of cleanup. Please see Sections 12 and 14 of this ROD.

3) ***Comment.*** *MDEQ's policy supports an "acceptable risk" as being 1x10-5 or less. EPA should require additional response action at sites where the excess cancer risk exceeds 1x10-5.*

EPA Response. The NCP establishes "acceptable risk" in the $1x10^{-4}$ to $1x10^{-6}$ range. While MDEQ's policy may differ from the NCP, the State's policy is not considered an ARAR and it has not been applied consistently across Superfund sites in Montana.

4) ***Comment.*** *During design, EPA should reevaluate the removal/disposal of the small amount of impacted soil along the shoulder of Highway 37.*

EPA Response. EPA agrees that the area of contamination on the highway embankment should be evaluated for potential removal, rather than capping. Please see Section 12 of this ROD.

2.2 Comments Accepting the Preferred Alternative as an Interim Decision

The City of Libby, the City-County Board of Health for Lincoln County, and the CAG each support a remedy once a thorough risk assessment has been completed. Each of these groups also indicated a willingness to accept moving forward with the preferred alternative as an interim decision. The City-County Board of Health (Board of Health) for Lincoln County joined in the comments submitted by the City of Libby for OU1 and OU2. The Board of Health also acknowledged the Libby Area TAG for its input and assistance.

EPA Response: EPA does not believe that an interim action is appropriate for the former Screening Plant property. Interim actions are typically limited in scope and institute temporary measures to stabilize a site. The selected remedy provides a comprehensive cleanup and includes requirements for ICs and operation and maintenance. The selected remedy will be subject to continual re-evaluation, as we learn more about asbestos, to ensure protectiveness of the remedy into the future.

As important as it is to take action now to prevent continued human exposure to LA, EPA recognizes the importance of new information as our knowledge about the affects of Libby Amphibole asbestos grows through further investigation. EPA will review the protectiveness of the remedy no less often than every five years. In addition, when the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c). Although EPA does not anticipate any future modifications to the selected remedy, additional response actions will be taken as necessary to protect public health and the environment.

5) ***Comment.*** *The ROD should state that in areas to be excavated, soil will be removed to a depth of 18 inches and, where vermiculite is visible; contamination should be followed and removed completely regardless of depth.*

EPA Response. Please see the response to #2.

6) ***Comment.*** *The ROD should explicitly state who is to pay for O&M costs and from where that money is to come.*

EPA Response. A detailed O&M plan will be developed as part of the remedial design. Both EPA and MDEQ have established accounts to fund O&M activities once remedies have been implemented.

7) ***Comment.*** *EPA should also be responsible for the cost of design, adoption, implementation and enforcement of ICs.*

EPA Response. ICs are considered an integral part of the remedy, so development and implementation of the ICs will be conducted as part of the remedial action. Response actions are funded through a settlement with Grace. Please see Section 12.3.2 of this ROD.

8) ***Comment.*** *The EPA has to ensure that all pathways of exposure have actually been closed by implementation of the selected remedy at OU2. Any fibers found after the remedy is in place would constitute failure of the remedy, since there are no toxicity studies upon which to base a safe exposure level.*

EPA Response. To confirm the effectiveness of this selected remedy, EPA will conduct a risk assessment following construction of the remedy. The risk assessment will include activity based sampling to measure the soil-to-air exposures addressed by the remedy. ABS will include an evaluation of potential exposure to workers and activities associated with the anticipated future land use of OU2. Cross contamination is likely to be a lingering issue in Libby.

While EPA's goal is to break the soil to air exposure pathway, it is unlikely that any remedy will completely eliminate all fibers due to the potential for cross contamination. The remedy selected for OU2 includes maintenance requirements, ICs, and routine review to evaluate the continued effectiveness of the remedy.

9) ***Comment.*** *The ROD must contain post-remedy implementation ABS to ensure the effectiveness of the remedy. The ROD must also contain post-remedy implementation public health studies to ensure the effectiveness of the remedy at no cost to the City.*

EPA Response. Please see response to #8. In addition to a risk assessment following construction of the remedy, which will include ABS, studies will continue on the potential human health and ecological affects of LA. As new information becomes available, and no less often than every five years, EPA will re-evaluate the remedy for effectiveness.

10) ***Comment.*** *The selected remedy for OU2 must be durable and effective. The ROD must include stringent O&M requirements.*

EPA Response. Please see response to #6.

11) ***Comment.*** *The City asks EPA to delay the ROD until the City better understands the toxicity of LA.*

EPA Response. EPA believes that it is prudent to move forward taking remedial action to reduce exposure and protect public health. Removal and/or capping contaminated soil will mitigate potential current and future human exposure pathways that contribute to an unacceptable risk at these locations. Since the soil-to-air exposure pathway will be broken, it is not necessary to have a complete understanding of the toxicity of LA asbestos. However, EPA recognizes the importance of incorporating new information as our knowledge about the affects of LA grows through further study. EPA will review the protectiveness of the remedy no less often than every five years. In addition, when the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c).

12) ***Comment.*** *The proposed plans for OU1 and OU2 describe an interim remedy that, following additional study, may be deemed final or may require augmentation. A ROD based on the proposed plans should be considered interim.*

EPA Response. EPA has already completed significant clean up at OU2. Remaining work, identified in this ROD, represents a comprehensive remedy for the property to include excavation, capping, O&M and ICs. Following implementation of the remedy, EPA will conduct a quantitative risk assessment, to include ABS, to confirm effectiveness of the remedy. Remedies selected in RODs are continually subject to modification based on new information. EPA will evaluate the effectiveness of the remedy at least every five years to ensure protectiveness. These routine evaluations will include any new information gained from the on-going Libby Action Plan investigations. In addition, when the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c).

13) ***Comment.*** *Further research and testing is needed to better define the relationship between concentrations of LA in soil and indoor dust to airborne concentrations of LA before a final remedy can be determined.*

EPA Response. Please see response to #12.

14) ***Comment.*** *Until activity based sampling, together with reliable sampling and analytical methods for LA in solid matrices, is complete, the selected remedies for OU1 and OU2 should not be considered final.*

EPA Response. Remedies selected in RODs are continually subject to modification based on new information. EPA will evaluate the effectiveness of the remedy no less often than every five years to ensure protectiveness. These routine evaluations will include any new information gained from the on-going Libby Action Plan investigations. In addition, when the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c). Also, please see response to #8.

15) ***Comment.*** *Extensive activity based sampling should be performed throughout the Libby site to determine potential cumulative exposure of residents to LA. This sampling should include surface wipe samples of protective clothing worn and equipment used by the researchers, perimeter samples, background samples, soil moisture and wind data, and information on particle size of asbestos structures.*

EPA Response. Cumulative risk across the Libby site will be addressed in the remedy decision for residential soil, OU4. The selected remedy for OU2 will be designed to break potential exposure from the soil-to-air pathway. Effectiveness of the remedy will be confirmed through a risk assessment (including activity based sampling) following implementation of the remedy, and continued monitoring.

EPA recognizes the importance of incorporating new information as our knowledge about the affects of LA grows through further study. EPA will review the protectiveness of the remedy no less often than every five years. In addition, when the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c).. Although EPA does not anticipate any future modifications to the selected remedy, additional response actions will be taken as necessary to protect public health and the environment.

16) ***Comment.*** *ABS has shown that it is not known if all pathways of exposure are discovered and/or those that are known are completely understood. As such, the proposed plans cannot be said to accomplish the goal of severing all pathways and the assessments of risks of continued exposure must be fully included in the proposed plans.*

EPA Response. Please see response to #14.

17) ***Comment.*** *There are inadequacies in EPA's present approach to risk assessment at the Libby site in general, and the proposed plans for OU1 and OU2 in particular. These inadequacies call into question the accuracy and reliability of the data EPA relies upon to make its risk assessments.*

a. ***Comment.*** *Uncertainty is increased when using dose-response information only from animal studies and dose-response information from high doses to predict adverse health effects from low exposure, and not considering increased susceptibility of special groups within the exposed population.*

EPA Response. EPA agrees that there is uncertainty in the risk assessment process. We also acknowledge that risk estimates were not made for all exposure pathways at OU2 and that risk may be underestimated. However, the most significant exposure pathway of soil-to-outdoor air has been addressed with the ABS. Using the EPA Framework Guidance (2008), theoretical excess cancer risks were estimated using the existing inhalation unit risk factor and ABS exposure data. Exposures were bracketed using average and maximum air concentrations. This is standard risk assessment practice where sample variance

exceeds an upper bound estimate of the mean concentration. Using the maximum air concentration to estimate theoretical risk is a conservative approach for estimating risk. Risks exceeded the threshold value for acceptability and further remedial action is required. The screening level risk assessment fulfills the goals of risk assessment at OU2. The decision to move forward based on cancer risk levels alone is appropriate and EPA believes the action is necessary to protect public health.

b. ***Comment.*** *Current risk models may underestimate the risk associated with exposure to LA. The current risk models do not address susceptible populations or brief exposures to high levels of LA. The current risk models do not adequately address risks associated with low-dose exposure to the mixed LA seen in Libby. Current risk models assume a linear relationship and the slope is largely derived from occupational cohorts with much higher exposure levels.*

EPA Response. EPA acknowledges that current risk models may underestimate the risk associated with exposure to LA. The inhalation unit risk (IUR) factor is based on additive risk of lung cancer and mesothelioma, using a relative risk model for lung cancer and an absolute risk model for mesothelioma. The data used for the derivation of the IUR utilized experimental groups exposed to several forms of asbestos, but primarily chrysotile and tremolite asbestos. LA contains approximately 6% tremolite in its mixture. EPA acknowledges that LA is different than chrysotile asbestos, but it is the only value available.

EPA has determined that based on known human health risks, it is important to proceed with a comprehensive remedy to protect human health now. New information will be considered as it is developed to ensure effectiveness of the remedy into the future.

c. ***Comment.*** *Exposure estimates provided in the epidemiological reports used to derive the current risk models are often highly uncertain. Cancer predictions based on the current method may be underestimating risk by up to 20%.*

EPA Response. Using the current IUR factor may underestimate the actual risk. Although it may be underestimated, the available value indicates that current exposure is unacceptable and steps must be taken to reduce exposure now.

d. ***Comment.*** *A reference concentration for inhalation exposure to LA, including non-cancer risks of LA fibers less than 0 .5 micrometers (μm) in length and 0.25 μm in diameter, must be developed and used for future sampling.*

EPA Response. The toxicity of fibers less than 5 μm in length and less than 0.25 μm in diameter is not being addressed specifically in the Libby Action Plan. The evidence that fibers of this size are significantly more hazardous than fibers greater than 5 μm in length and greater than 0.25 μm in diameter is sparse in the peer reviewed literature. It will take time to potentially address

this issue in laboratory experiments if the correct model for assessing the most critical endpoint is established. It will not be possible to ascertain these data in humans.

e. ***Comment.*** *The occurrence of non-cancer effects are a significant human health concern in Libby. These non-cancer adverse health outcomes may be more significant than cancerous effects and are not addressed by the current cancer risk models. Studies of former workers and residents provide strong evidence that exposure to LA results in an increased incidence of non-cancer adverse effects, and that these effects occur in some individuals who appear to have had only low exposure.*

EPA Response. Because cancer risk estimates exceed the threshold value for acceptability, remedial action is required. The decision to move forward based on cancer risk levels alone is appropriate and EPA believes that it is necessary to protect public health.

f. ***Comment.*** *Animal and in-vitro studies suggest that fibers less than 5 μm in length may play a role in fibrosis. To reduce uncertainties and address the most significant health concerns in Libby, the reference concentration for inhalation exposure to LA should be based on TEM analysis, including analysis of short and thin fibers, and the role these fibers play in causing non-cancer adverse health effects.*

EPA Response. Existing TEM analysis of bulk soil is not a viable option since soil particles interfere with counting LA fibers. The TEM analysis of LA includes a fiber size distribution of the detected fibers. However, it is not feasible to assess differential toxicity to the short, small-diameter sized fibers. EPA will evaluate a new technology this field season that may provide greater sensitivity analysis of bulk soil. EPA will also continue activity based sampling to assess soil contamination this field season.

g. ***Comment.*** *There is a lack of epidemiology data for the Libby site that must be addressed. Epidemiological studies, together with toxicological studies are needed to assess the health effects of low-dose exposures to LA.*

EPA Response. Toxicity factors for use in risk assessment originate from experimental animal data, human epidemiological data, or the combination of both data sources. EPA currently employs a toxicity factor for asbestos that is based on numerous epidemiological investigations. EPA will use Libby-specific toxicity factors when they become available. However, environmental exposures and environmentally based epidemiological investigation are just now being initiated in Libby. It will be several years before these factors may be developed for and applied to the Libby residents.

h. ***Comment.*** *The present data gaps in solid matrix sampling data quantification must be addressed. The current analytical methods for solid matrix sampling are insufficient for cleanup decisions.*

EPA Response. EPA acknowledges that current analytical methods for bulk soil lack sensitivity. Further, it is difficult to predict concentrations of asbestos in air compared to concentrations of asbestos in soil. However, current findings show that it is necessary to move forward with a remedy at the OU2 to prevent continued exposure to asbestos. EPA will consider new information as analytical methods improve to routinely evaluate effectiveness of the selected remedy.

18) ***Comment.*** *The present data gaps in solid matrix sampling data quantification must be addressed. The current analytical methods for solid matrix sampling are insufficient for cleanup decisions.*

EPA acknowledges that current analytical methods for bulk soil lack sensitivity. Further, it is difficult to predict concentrations of asbestos in air compared to concentrations of asbestos in soil. However, current findings show that it is necessary to move forward with a remedy at the Export Plant to prevent continued exposure to asbestos. EPA will consider new information as analytical methods improve to routinely evaluate effectiveness of the selected remedy.

19) ***Comment.*** *The estimation of bulk asbestos content in soil at OU1 and OU2 is uncertain because the soil sampling protocol may not accurately quantify the concentration of LA. Given the limitations of the analytical methods for identifying and quantifying LA in soils at OU1 and OU2, it is impossible to say that the pathways of exposure have been eliminated.*

EPA Response. EPA agrees that current analytical methods for bulk soil analysis lack sensitivity and are marginally acceptable for health-based decision making. PLM and PLM-VE lack the sensitivity based on comparison with corresponding ABS sampling on the same soil samples. EPA will evaluate a new technology this field season that may provide greater sensitivity analysis of bulk soil. EPA will also continue ABS to assess soil contamination this field season.

20) ***Comment.*** *The present data gaps in air sampling quantification must be addressed. Because of the variability of LA in air, estimates of mean exposure concentrations are uncertain due to random variation between samples. Risk calculations based on mean air concentrations, rather than the 95th upper confidence level, represent a level of uncertainty which could result in an underestimate of risk. Additionally, air sampling data reported from a laboratory as non-detect are treated as zero. It is probable that some of these zero values contain LA that is not quantified. Finally, air sampling data from LA represents only a point in time that may not be representative of exposure under various activities and environmental conditions. Risk assessments based on estimated mean anticipated exposures in OU1 and OU2 are not appropriate, and risk calculation should be based on concentrations expected for the greatest exposure scenario anticipated in OU1 and OU2.*

EPA Response. EPA acknowledges that current analytical methods and risk models may underestimate the risk associated with exposure to LA. EPA has also determined that based on known human health risks, it is important to proceed

with a comprehensive remedy to protect human health now. New information and improved analytical methods will be considered as they are developed to ensure effectiveness of the remedy into the future.

As a point of clarification, ambient air samples are not single point estimates. The ambient air samples are taken over time (usually for 5 consecutive days) and are repeated for up to two months at a time.

21) ***Comment.*** *The present data gaps in cleanup efficacy data and elimination of exposure pathways must be addressed. Because trace levels or higher levels of LA are present in soil at OU1 and OU2 and in other areas throughout Libby, future exposure associated with disturbing on-site soil during construction or redevelopment events at these sites is a potential exposure pathway. In addition, trace levels or higher levels of LA are vulnerable to disturbance by various anthropogenic or natural activities. Consequently, residents can be potentially exposed to asbestos fibers released from asbestos-containing debris or soil due to disturbance by common human intrusive activities or natural processes either now or in the future. Uncontrolled drainage of water from areas contaminated with LA may result in environmental dispersion of LA.*

Indoor, stationary air monitoring performed at varying time periods following completion of cleanup actions at specific properties in Libby showed low airborne concentrations of LA following clean up, and the level remained low for about a year. However, at some of the homes, there appeared to be an upward trend in airborne levels of LA, suggesting the potential for re-contamination. This indicates pathways of exposure still exist after the completion of cleanup activities. EPA should base cleanup targets on activities that have been shown to produce elevated concentrations by TEM analysis. Detailed site-specific monitoring using TEM methods is needed for a more comprehensive consideration of site-specific conditions related to OU1 and OU2 to assure that exposure pathways have been eliminated.

EPA Response. EPA will conduct ABS following implementation of the remedy to confirm effectiveness of the remedy. This comment also highlights the importance of ICs and robust maintenance requirements to prevent inadvertent exposure to remaining contamination through common human activities or natural processes.

22) ***Comment.*** *The Libby site conceptual model addressing overall cumulative exposure and potential health risks across all operable units must be considered.*

EPA Response. Cumulative risk across the Libby site will be addressed in the remedy decision for residential soil, Operable Unit 4. The remedy of OU2 will be designed to break potential exposure from the soil-to-air pathway. Effectiveness of the remedy will be confirmed through a risk assessment (including ABS) following implementation of the remedy, and continued monitoring. EPA recognizes the importance of new information as our knowledge about the affects of LA asbestos grows through further study. EPA will review the protectiveness of the remedy at least every five years. In addition, EPA will review the remedy, as required by

CERCLA Section 121(c), once new toxicity factors are established through on-going Libby Action Plan investigations. Although EPA does not anticipate any future modifications to the selected remedy, additional response actions will be taken as necessary to protect public health and the environment.

23) ***Comment.*** *A program to determine the continuing effectiveness of the final remedies should be part of any ROD issued for the Site. The decision must include a long-term public health monitoring program together with triggers for future augmentation of the remedies should the occurrence and pathologies of asbestos-related diseases not improve to a significant level. EPA must determine what those acceptable trigger levels should be and seek public comment on those levels.*

EPA Response. EPA agrees that effectiveness of the remedy must be routinely evaluated following implementation to ensure protection of public health and the environment. As new information is developed through the on-going Libby Action Plan investigations, it will be considered in the routine evaluations.

2.3 Comments Opposed to the Preferred Alternative

Two citizens groups (submitting one comment letter), the TAG, and six individuals are opposed to the preferred alternative for remediation of OU2.

24) ***Comment.*** *EPA has not yet established scientifically defensible toxicity information for LA. Until appropriate data are developed, the Site should not precede past Baseline Risk Assessments and RI/FS studies or plans to a ROD for any OU.*

EPA Response. EPA continues to study the effects of LA contamination on human health and the environment. While these important studies are underway, current findings indicate that it is necessary to move forward with a remedy at OU1 to prevent continued exposure to LA.

EPA further agrees that there is a lack of complete understanding of the toxicity of LA fibers. The lack of a reference concentration to estimate threshold hazard is also a concern. The reference concentration would allow for evaluation of the theoretical potential for developing pleural disease(s). The hazard quotient has traditionally been the most sensitive predictor of hazard to children. The University of Cincinnati and EPA are developing a reference concentration for LA based on the Marysville, Ohio worker cohort. EPA is also involved with the University of Cincinnati and NCEA to develop a LA-specific miner IUR for use in risk assessment. This important information is expected to be available in early 2011.

EPA believes it is important to proceed with a comprehensive remedy to protect human health from known exposure to LA. This remedy will address both surface and subsurface soil. This approach will also provide ICs and define maintenance requirements for any contamination left in place.

a. ***Comment*** *Final decisions are not appropriate until scientifically valid information is available to quantify non-cancer risks.*

EPA Response. Because cancer risk estimates exceed the threshold value for acceptability, remedial action is required. The decision to move forward based on cancer risk levels alone is appropriate and EPA believes that it is necessary to protect public health.

b. ***Comment.*** *EPA must re-evaluate the Site when appropriate scientific information is available for estimating cancer risks.*

EPA Response. As important as it is to take action now to prevent continued exposure, EPA also recognizes the importance of incorporating new information as our knowledge about the affects of LA grows through further study. EPA will review the protectiveness of the remedy no less often than every five years. In addition, when the site-wide risk assessment is complete, the agencies will re-evaluate the remedy in accordance with the review requirements at CERCLA Section 121(c).

25) ***Comment.*** *Exposure levels in Libby are still unknown. In addition to EPA's lack of appropriate toxicology and epidemiology data, EPA has not properly established actual exposures to the residents of Libby.*

EPA Response. EPA continues to study the effects of LA contamination on human health and the environment. While these important studies are underway, current findings indicate that it is necessary to move forward with a remedy at OU2 to stop continued exposure to LA.

a. ***Comment.*** *Cumulative risk must be considered before any ROD is finalized.*

EPA Response. Please see response to #15.

b. ***Comment.*** *Analytical methods used by EPA are not sensitive enough to measure LA present at concentrations at or near an acceptable risk level.*

EPA Response. Please see responses to #18, #19, and #20.

c. ***Comment.*** *The value of PLM analysis for determining actual exposures is severely limited, but EPA uses PLM to establish cleanup goals for OU2.*

Please see response to #19.

d. ***Comment.*** *Any soil analytical method must be confirmed with ABS.*

EPA Response. Please see response to #14.

e. ***Comment.*** *Once representative sample results are available, EPA should use appropriate exposure calculations.*

EPA Response. Please see response to #21.

f. ***Comment.*** *EPA did not attempt to establish a cleanup goal for either OU1 or OU2.*

EPA Response. Please see Section 8.1 of this ROD for a description of RAOs in OU2. See Section 8.2 for a description of remediation goals. A discussion of performance standards is found in Section 12.6. Also, please refer to the proposed plans for both OU1 and OU2, which contain the RAOs.

26) ***Comment.*** *EPA has erred in establishing the scope of the response.*

a. ***Comment.*** *EPA's response should be based on LA concentrations, not historical property boundaries.*

EPA Response. The scope of the Libby site includes all areas of the Site where LA concentrations may be elevated. If some of these areas are not specifically addressed by the proposed plan for OU2, they will be addressed as work continues on other operable units of the Site.

b. ***Comment.*** *Consideration of cumulative risk is essential.*

EPA Response. Please see response #15.

c. ***Comment.*** *Ecological risk and risks to endangered species must be evaluated before work is conducted adjacent to the Kootenai River or Rainy Creek.*

EPA Response. An ecological risk assessment is being developed at the mine site (OU3). Once that work is complete, EPA will build upon information gathered during the ecological risk assessment for OU3 to identify potential pathways and receptors to evaluate ecological risk at OU2.

27) ***Comment.*** *EPA cannot justify its selection of preferred alternatives.*

a. ***Comment.*** *Selection of preferred alternative is premature.*

EPA Response. Based on current information, taking action now is necessary to protect public health and the environment. Removal of soil and capping of soils mitigates/eliminates potential current and future human exposure pathways that contribute to an unacceptable risk at these locations. EPA recognizes there are uncertainties with the proposed plan but the public health benefit outweighs the alternative of taking no action at this time.

b. ***Comment.*** *Relocation must be considered as an alternative.*

EPA Response. Relocation will be considered in the FS for the residential areas of the Site, OU4.

28) ***Comment.*** *Although the plans provide some information on the preferred remedial action, EPA should issue a detailed work plan for public comment (when enough risk-based data are available).*

EPA Response. EPA does not plan to generate preliminary, intermediate, and final design documents for the work at OU2.

a. ***Comment.*** *Evaluation of potential for re-contamination.*

EPA Response. EPA shares the concern over the potential for re-contamination. Robust maintenance requirements will be identified as part of the remedial design. EPA will also work closely with affected stakeholders to implement suitable ICs. Routine reviews, as required by CERCLA Section 121(c), will evaluate the effectiveness of O&M and ICs.

b. ***Comment.*** *Shoreline and surface water impacts.*

EPA Response. Please see response to 26c.

c. ***Comment.*** *Analysis of incoming fill. EPA's remediation work plan should include TEM analysis of all incoming fill to confirm the absence of amphibole asbestos.*

EPA Response. EPA imports fill material from beyond the Libby valley. Asbestos characterization includes visual inspection as well as PLM-VE. The soil is also characterized for other potential contaminants to ensure that it is suitable for use as fill. Fill specifications have been developed for both common fill and top soil and are available for review upon request through the EPA Information Center in Libby. Existing TEM analysis of bulk soil is not a viable option since soil particles interfere with counting LA fibers.

d. ***Comment.*** *Consultant/contractor oversight.*

EPA Response. EPA agrees that it is important to provide sufficient oversight to its contractors.

e. ***Comment.*** *Confirmation monitoring.*

EPA Response. Please see response to #8.

f. ***Comment.*** *Ongoing maintenance of containment.*

EPA Response. Long-term O&M will be required to maintain the integrity of the engineered controls, backfilled areas, and covers, including covers placed

during previous response actions and as part of this remedy. See also response to #6.

29) ***Comment.*** *Public availability of information.*

EPA Response. The RI/FS reports for both OU1 and OU2 are available on the web at www.epa.gov/libby. These and other key documents are also available at the EPA Information Center in Libby. EPA will also distribute a fact sheet describing the remedial design for public information.

30) ***Comment.*** *Uncertainty in risk assessment.*

EPA Response. Please see responses to #17a, #17b and #17c.

31) ***Comment.*** *Lack of a reference concentration (RfC) for inhalation exposure to LA, including non-cancer risks of LA fibers less than 5 μm in length and .25μm in diameter.*

EPA Response. Please see responses to #17d

32) ***Comment.*** *Lack of epidemiology data in Libby.*

EPA Response. Please see response to #17g.

33) ***Comment.*** *Gaps in solid matrix sampling data quantification.*

EPA Response. Please see response to #18.

34) ***Comment.*** *Gaps in exposure pathway quantification.*

EPA Response. Please see response to #15.

35) ***Comment.*** *Gaps in cleanup efficacy data and elimination of exposure pathways.*

EPA Response. Please see response to #21.

36) ***Comment.*** *According to EPA guidance, EPA is required to understand the cumulative risk from all exposures in the Libby area. EPA must determine the complete exposure pathways that exist for the Libby site and quantify the magnitude, frequency, and duration of exposure for each pathway in Libby to determine cumulative risk. Exposure assessments must consider past, present and future exposures.*

EPA Response. The Risk Assessment Guidance for Superfund recommends that cumulative risk be calculated where possible. It is not required to evaluate all cumulative risks. It is sufficient to evaluate the major exposure pathways; not necessarily all pathways. The guidance recommends evaluation of a CTE and a RME scenario. While understanding exposure pathways and quantification of significant pathways is important in risk evaluation, it is not necessary to evaluate all pathways if there are pathways that are major sources of exposure. In addition,

exposure assessments consider only the current data. It is impossible to reconstruct and use past data for risk assessments just as it is impossible to use future data. A post-remediation risk assessment can be used to confirm that remedial goals were achieved and that risk levels are acceptable.

37) ***Comment.*** *All contamination should be removed regardless of cost. Containment is not clean up.*

EPA Response. EPA evaluates nine criteria when selecting a remedy. Any remedy must comply with two threshold criteria which are 1) protection of human health and the environment and 2) compliance with ARARs. EPA believes that the selected remedy meets these criteria and provides the best balance among the remaining criteria.

38) ***Comment.*** *The cleanup should be performed systematically to prevent cross-contamination.*

EPA Response. EPA agrees that cross-contamination may be a lingering issue in Libby. The remedy selected for OU2 includes maintenance requirements, ICs, and routine review to evaluate the continued effectiveness of the remedy.

39) ***Comment.*** *Insufficient funds have been set aside to manage operation and maintenance costs into the future.*

EPA Response. Both EPA and MDEQ have established accounts to fund O&M activities once remedies have been implemented. See Exhibit 12-1 in this ROD for a cost estimate including operation and maintenance costs and periodic review costs.

40) ***Comment.*** *All contamination should be removed as part of a systematic cleanup to avoid the necessity of ICs.*

EPA Response. Containment remedies, including maintenance and ICs, are a viable approach to protect human health and the environment. Contamination remains at most Superfund projects requiring ICs and routine evaluation to ensure continued protectiveness of the remedy.

41) ***Comment.*** *EPA must ensure that they have actually closed pathways of exposure.*

EPA Response. Please see response to #8.

42) ***Comment.*** *ABS is necessary to protect human health.*

EPA Response. Please see response to #8.

43) ***Comment.*** *The remedy put in place must be durable and effective.*

EPA Response. Please see response to #28(f). In addition to long-term maintenance requirements, ICs will be an integral part of the remedy. Effectiveness of the

remedy will be evaluated no less often than every five years to ensure protection of human health and the environment.

44) ***Comment.*** *We should be allowed to view EPA's responses to our comments and have time to correct any flaws in those responses before the remedial action is initiated.*

EPA Response. EPA does not request public review of or comment on the Responsiveness Summary. However, any comments submitted will become part of the Administrative Record for the Site.

45) ***Comment.*** *Science must come before politics.*

EPA Response. Please see response to #37.

46) ***Comment.*** *A quantitative risk assessment is necessary to protect human health.*

EPA Response. EPA will perform additional ABS once the remedy is implemented to confirm effectiveness of the remedy. In addition, EPA will routinely evaluate the remedy for protectiveness as we continue to learn more from the on-going Libby Action Plan investigations.

47) ***Comment.*** *OU8 (State Highways) has the potential to re-contaminate every OU cleaned up to date and should be addressed before any other OU.*

EPA Response. EPA recognizes the importance of these transportation corridors and is proceeding with a RI for the State Highways and Secondary Roads. The investigation and evaluation of alternatives will take time and won't be completed prior to remedy selection at OU1 and OU2.

48) ***Comment.*** *Regarding LA and air quality, is it safe to raise a child in Libby? Is the safety of the schools in question?*

EPA Response. The most recent ambient air quality report summarizes air sampling at 7 to 14 stations throughout Libby (USEPA & SRC, Inc., 2009). The report indicates that LA air concentrations range from 2 x 10-6 to 9 x 10-6 s/cc. These concentrations are approximately 10,000 times less than the reported air concentrations in downtown Libby during the period when the mine and milling plants were in operation. By comparison, the national urban concentrations of asbestos fibers range from 3.9 x 10-4 to 5 x 10-5 f/cc. Hence, the ambient air concentrations of LA in Libby are less than the national average air concentrations and are within acceptable ranges.

ABS at Libby schools indicated that LA fibers were detected in indoor air at two sampling locations and that student activity samples outdoors in the school yards yielded three detections. All detections were equivalent to detecting 1 fiber in the grid openings counted. These are low-level detections just above the method detection limit. Using school-specific exposure assumptions, the exposures

calculated for the various activities were in acceptable ranges. Trace levels of LA were detected in soils at the schools. These will be addressed by EPA and the school board. While exposure to children is a concern due to their early exposure and longer latency periods, the levels of LA exposure were judged acceptable at this time. Note: s/cc is a percentage of the total fibers/cc; based on data from OU 4, the percentage is approximately 59%.

49) ***Comment.*** *I have not been fully informed in the specifics of the contamination in Libby and stand opposed to the EPA ROD and any maintenance program that comes out of it.*

EPA Response. Please see responses to 8, 9, 10, 11, 17 (a) - (g), 24, 24(a), and 25.

50) ***Comment.*** *We need results of toxicity studies, especially human, before any RODs.*

EPA Response. Please see responses to 17 (a) - 17 (g).

51) ***Comment.*** *ICs should be discussed prior to selection of a remedy.*

EPA Response. ICs will be an integral part of the remedy. Development and implementation of ICs will be conducted as part of the remedial design and remedial action. EPA has been working closely with the O&M work group to make recommendations on suitable ICs. For OU2, these recommendations will be shared with the City-County Board of Health. In addition, language drafted for this ROD discussing ICs was shared with the TAG, O&M Work Group, and City of Libby in February 2010.

52) ***Comment.*** *Given the presence of tansy weed in the Rainy Creek drainage, EPA must investigate the possibility that haul traffic on the road is spreading contaminated soil.*

EPA Response. All trucks carrying contaminated soil for disposal are tarped to prevent the spread of contaminated soil.

53) ***Comment.*** *EPA must provide a quantitative evaluation of risk to human health.*

EPA Response. EPA has completed a screening, or qualitative, risk assessment which confirms the need for remedial action on the remaining areas of LA-contaminated soil at OU2. Once the remedy has been implemented, EPA will conduct activity based sampling to quantitatively confirm the effectiveness of the cleanup to protect human health.

54) ***Comment.*** *Rainy Creek Road, and the haul traffic on that road, present an exposure pathway that has not been evaluated.*

EPA Response. Please see the response to #52.

55) ***Comment.*** *Ecological risk must be addressed for OU2.*

EPA Response. Please see the response to #26(c).

56) ***Comment.*** *Explain how remediation procedures have changed over time.*

EPA Response. For action levels and clearance criteria, EPA will continue to use the protocols developed in the "*Libby Asbestos Site Residential/Commercial Cleanup Action Level and Clearance Criteria Technical Memorandum,*" dated December 2003. Prior to December 2003, criteria for residential cleanups were modified occasionally as EPA learned new information about LA.

57) ***Comment.*** *Stockpiling of contaminated soil at the amphitheater poses an imminent danger in the event of a heavy snow fall or heavy rain with substantial run off of water and mud.*

EPA Response. EPA is currently evaluating the appropriateness of the amphitheatre on Rainy Creek Road for the storage or disposal of contaminated soil. Results of that evaluation will be available to the public as soon as it is complete.

58) ***Comment.*** *ICs prevent unrestricted use of the property.*

EPA Response. ICs, or land use restrictions, are often placed on properties to limit activities that could compromise the integrity of the remedy. The controls may allow residential, commercial, and recreational land use, but will limit uses that might create an exposure pathway or damage the remedy. See ROD Section 12.3.2.

59) ***Comment.*** *EPA must provide a valid risk assessment for OU2.*

EPA Response. Please see responses to #53 and 17(a) – (f).

60) ***Comment.*** *There is not currently enough information to estimate cancer and non-cancer risks from community exposure to LA.*

EPA Response. Please see response to #15 and #17(a) – (f).

61) ***Comment.*** *ABS was never done at OU2.*

EPA Response. Please see response to #53.

62) ***Comment.*** *The PLM analytical method is not capable of identifying levels protective to human health.*

EPA Response. Please see response to #19.

63) ***Comment.*** *The sampling results from the root balls of a number of trees are invalid.*

EPA Response. From the comment, EPA is led to understand that the root balls of the trees could not have been contaminated with asbestos because the trees were balled and wrapped in burlap with soil taken from a nursery in Bonners Ferry, Idaho. A great number of samples from across the site were taken to support

development of the RI. Based on the results of the RI, EPA believes it is appropriate to take remedial action on the remaining areas of contaminated soil at OU2.

64) ***Comment.*** *There is a question as to the presence of low-spots in a sub-area of the flyway.*

EPA Response. Design for the selected remedy will take current site conditions into consideration prior to implementation of the excavation and backfill of any contaminated areas.

65) ***Comment.*** *The well log does not identify the presence of vermiculite in the core samples.*

EPA Response. Please see response to #64.

66) ***Comment.*** *Ecological risk must be addressed for OU2.*

EPA Response. Please see response to #26(c).

67) ***Comment.*** *A toxicity assessment and an epidemiological summary should be completed prior to a ROD.*

EPA Response. Please see response to #24 and #17(c).

68) ***Comment.*** *Stockpiling of contaminated soil at the amphitheater poses an imminent danger in the event of a heavy snow fall or heavy rain with substantial run off of water and mud.*

EPA Response. Please see response to #57.

Appendix A
Summary of Compliance with Federal and State Applicable or Relevant and Appropriate Requirements
OU1 - Former Export Plant Site and OU2 – Former Screening Plant Site

Summary of Federal and State Applicable or Relevant and Appropriate Requirements (ARARs) Compliance
OU1 - Former Export Plant Site, and OU2 – Former Screening Plant Site

I. INTRODUCTION

Section 121(d) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9621(d), the National Oil and Hazardous Substances Pollution Contingency Plan (the "NCP"), 40 CFR Part 300 (1990), and guidance and policy issued by the U.S. Environmental Protection Agency (EPA) require that remedial actions under CERCLA comply with substantive provisions of applicable or relevant and appropriate standards, requirements, criteria, or limitations (ARARs) from State of Montana and federal environmental laws and state facility siting laws during and at the completion of the remedial action. These requirements are threshold standards that any selected remedy must meet, unless an ARAR waiver is granted.

This document identifies ARARs for remedial actions to be conducted at the former Export Plant, Operable Unit 1 (OU1) and the Former Screening Plant, OU2, of the Libby Asbestos National Priorities Site. The following ARARs or groups of related ARARs are each identified by a statutory or regulatory citation, followed by a brief explanation of the ARAR and how and to what extent the ARAR is expected to apply to the activities to be conducted under this remedial action.

Substantive provisions of the requirements listed below are identified as ARARs pursuant to 40 Code of Federal Regulations (CFR) § 300.400. ARARs must be attained during and at the completion of the remedial action.[1] No Federal, State or local permit shall be required for the portion of any removal or remedial action conducted entirely on site in accordance with Section 121(e) of CERCLA.

II. TYPES OF ARARs

ARARs are either "applicable" or "relevant and appropriate." Both types of requirements are mandatory under CERCLA and the NCP.[2] Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria or limitations promulgated under federal environmental or state environmental and facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable.[3]

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to hazardous substances, pollutants, contaminants, remedial actions, locations, or other circumstances at a CERCLA site, address problems or situations

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1 40 CFR Section 300.435(b)(2); Preamble to the National Oil and Hazardous Substances Pollution Contingency Plan, 55 Federal Register (FR) 8755-8757 (March 8, 1990).

2 CERCLA § 121(d)(2)(A), 42 U.S.C. § 6921(d)(2)(A). See also, 40 CFR § 300.430(f)(1)(i)(A).

3 40 CFR § 300.5.

sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.[4]

The determination that a requirement is relevant and appropriate is a two-step process: (1) determination if a requirement is relevant and (2) determination if a requirement is appropriate. In general, this involves a comparison of a number of site-specific factors, including an examination of the purpose of the requirement and the purpose of the proposed CERCLA action; the medium and substances regulated by the requirement and the proposed action; the actions or activities regulated by the requirement and the remedial action; and the potential use of resources addressed in the requirement and the remedial action. When the analysis results in a determination that a requirement is both relevant and appropriate, such a requirement must be complied with to the same degree as if it were applicable.[5]

ARARs are contaminant, location, or action specific. Contaminant specific requirements address chemical or physical characteristics of compounds or substances on sites. These values establish acceptable amounts or concentrations of chemicals which may be found in or discharged to the ambient environment.

Location specific requirements are restrictions placed upon the concentrations of hazardous substances or the conduct of cleanup activities because they are in specific locations. Location specific ARARs relate to the geographical or physical positions of sites, rather than to the nature of contaminants at sites. Action specific requirements are usually technology based or activity based requirements or limitations on actions taken with respect to hazardous substances, pollutants or contaminants. A given cleanup activity will trigger an action specific requirement. Such requirements do not themselves determine the cleanup alternative, but define how chosen cleanup methods should be performed.

Many requirements listed as ARARs are promulgated as identical or near identical requirements in both federal and state law, usually pursuant to delegated environmental programs administered by EPA and the state. The Preamble to the NCP provides that such a situation results in citation to the state provision and treatment of the provision as a federal requirement.

Also contained in this list are policies, guidance or other sources of information which are "to be considered" in the implementation of the record of decision (ROD). Although not enforceable requirements, these documents are important sources of information which EPA and the State of Montana Department of Environmental Quality (MDEQ) may consider, especially in regard to the evaluation of public health and environmental risks; or which will be referred to, as appropriate, in developing cleanup actions.[6] These final ARARs will be set forth as performance standards for any and all remedial design or remedial action work plans.

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4 40 CFR § 300.5.

5 CERCLA Compliance with Other Laws Manual, Vol. I, OSWER Directive 9234.1-01, August 8, 1988, p. 1-11.

6 40 CFR Section 300.400(g)(3); Preamble to the NCP, 55 Fed. Reg. 8744-8746 (March 8, 1990).

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
Federal ARARs						
National Historic Preservation Act, 16 U.S.C. § 470, 40 CFR 6.301(b) 36 CFR 60, 63, 800	Applicable	This statute and implementing regulations require federal agencies to take into account the effect of this response action upon any district, site, building, structure, or object that is included in or eligible for the National Register of Historic Places.	If cultural resources on or eligible for the National Register are present, it will be necessary to determine if there will be an adverse effect and, if so, how the effect may be minimized or mitigated. The unauthorized removal of archaeological resources from public or Indian lands is prohibited without a permit, and any archaeological investigations at a site must be conducted by a professional archaeologist. To date, no such resources have been found at OU1 or OU2. If any are found, consultation with the State Historic Preservation Office and compliance with the National Historic Preservation Act will be addressed during remedial design.		✓	
Archaeological and Historic Preservation Act, 16 U.S.C. § 469, 40 CFR 6.301(c), 43 CFR 7	Applicable	This statute and implementing regulations establish requirements for the evaluation and preservation of historical and archaeological data, which may be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity or program.			✓	
Fish and Wildlife Coordination Act, 16 U.S.C. §§ 661, et seq., 40 CFR 6.302(g), 50 CFR 83, 33 CFR 320-330	Applicable	This statute and implementing regulations require coordination with federal and state agencies for federally funded projects to ensure that any modification of any stream or other water body affected by any action authorized or funded by the federal agency provides for adequate protection of fish and wildlife resources.	If the remedial action involves activities that affect wildlife and/or non-game fish, federal agencies must first consult with the U.S. Fish and Wildlife Service and the relevant state agency with jurisdiction over wildlife resources.		✓	
Endangered Species Act, 16 U.S.C. § 1531, 40 CFR 6.302(h), 50 CFR 17 and 402	Applicable	This statute and implementing regulations provide that federal activities not jeopardize the continued existence of any threatened or endangered species. Endangered Species Act, Section 7 requires consultation with the U.S. Fish and Wildlife Service to identify the possible presence of protected species and mitigate potential impacts on such species.	If threatened or endangered species are identified within the remedial areas, activities must be designed to conserve the species and their habitat. To date no threatened or endangered species have been identified in the area of the site.		✓	

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
Federal ARARs						
Migratory Bird Treaty Act, 16 U.S.C. §§ 703, et seq., 50 CFR 10.13	Applicable	This requirement establishes a federal responsibility for the protection of the international migratory bird resource and requires continued consultation with the U.S. Fish and Wildlife Service during remedial design and remedial construction to ensure that the cleanup of the site does not unnecessarily impact migratory birds.	The selected remedial actions will be carried out in a manner to avoid adversely affecting migratory bird species, including the bald eagle and including individual birds or their nests.		✓	
Clean Air Act (CAA), 40 CFR 61.149 Note: Section 61.149 (c)(2) not delegated to State per 40 CFR 61.157	Relevant and Appropriate	This Act and implementing regulations, 40 CFR 61.149, establish detailed procedures and specifications for handling and disposal of asbestos containing material (ACM) waste generated by an asbestos mill. The provision allows an alternative emission control and treatment method.	Requirements under this regulation are considered relevant and appropriate to the ACM (friable material containing > 1% asbestos) disposal. It is not applicable because the facilities do not meet the regulatory definition of an asbestos mill and because EPA does not expect to encounter ACM at OU1 or OU2.			✓
CAA, 40 CFR 61.150 Note: Section 61.150(a)(4) not delegated to the State per 40 CFR 61.157	Relevant and Appropriate	Standard for waste disposal for manufacturing, fabricating, demolition, renovation and spraying operations. Provides detailed procedures for processing, handling and transporting ACM waste generated during building demolition and renovation (among other sources). The provision allows an alternative emission control and treatment method.	Applicable to RACM generated by building demolitions that may occur as part of the remedial action. Relevant and appropriate for soil disturbance activities and for asbestos contaminated material that does not meet the strict definition of RACM. EPA does not expect to demolish buildings or otherwise generate RACM as part of this remedial action.			✓
CAA , 40 CFR 61.151 Note: Section 61.151(c) not delegated to the State per 40 CFR 61.157	Relevant and Appropriate	Standard for inactive waste disposal sites for asbestos mills and manufacturing and fabricating operations. Provides requirements for covering, revegetation and signage at facilities where RACM will be left in place. The provision allows an alternative control method.	Requirements under this regulation are considered relevant and appropriate to asbestos containing soils and/or debris left in place. It is not applicable because the facilities that are part of this remedial action do not meet the definitions of "facility" in the regulation and because EPA does not expect to encounter RACM at OU1 or OU2.			✓
CAA, 40 CFR 61.154 Note: Section 61.154(d) not delegated to the State per 40 CFR 61.157	Other Requirements	Standard for active waste disposal sites. Provides requirements for off-site disposal sites receiving ACM waste from demolitions and other specific sources. The provision allows an alternative emission control.				✓

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
Federal ARARs						
Toxic Substances Control Act, 40 CFR Part 763, Subpart G	Other Requirements	Asbestos abatement projects and asbestos worker protection. This subpart protects certain State and local government employees who are not protected by the Asbestos Standards of the Occupational Safety and Health Administration (OSHA). This subpart applies the OSHA Asbestos Standards in 29 CFR 1910.1001 and 29 CFR 1926.1101 to these employees.	The State requires that work be performed in accordance with 40 CFR 763.120 and 763.121 (asbestos abatement projects) and 29 CFR 1926.58 (asbestos standard for the construction industry). These requirements will be incorporated into the health & safety plan but do not meet the definition of an ARAR.			✓

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chemical	Location	Action
State of Montana ARARs						
Montana Asbestos Control Act (MACA), MCA 75-2-501 et seq., and implementing regulations at ARM 17.74.301 through 17.74.368	Applicable/ Relevant and Appropriate/ Other Requirements	The MACA and implementing rules establish standards and procedures for accreditation of asbestos-related occupations and control of the work performed by persons in asbestos-related occupations.	Only the portions of the MACA and implementing regulations governing the handling of RACM are potentially applicable or relevant and appropriate. All other provisions (e.g., those governing accreditation, training, etc.) do not meet the requirements of ARARs. As EPA does not expect to encounter RACM at OU1 or OU2, the provisions that qualify as ARARs are only be relevant and appropriate.			✓
MACA, MCA 75-2-501 et seq., ARM 17.74.355, ARM 17.74.359	Applicable/ Relevant and Appropriate	Asbestos abatement project permits. Asbestos abatement projects require a permit from DEQ. Permits must meet requirements at ARM 17.74.355 and ARM 17.74.359.	Applicable to material meeting the definition of RACM. Relevant and Appropriate for soils or contaminated material that does not meet the strict definition of RACM. The substantive requirements for performance of the work and proper disposal and will be met by the contractors used. On-site CERCLA actions do not require a permit. EPA expects soils excavated from OU1 and OU2 and debris generated in the remedial action will not be RACM. Though it is possible that some provisions could be relevant and appropriate for non RACM waste, most material will likely be handled under Montana solid waste provisions. See discussion below for solid waste ARARs.			✓
MACA, MCA 75-2-501 et seq., ARM 17.74.357	Applicable	Establishes air monitoring requirements for asbestos abatement projects, including for building clearance after abatement.	These requirements will be followed unless an equivalent or more stringent approach is deemed appropriate. This is not expected to be an ARAR as EPA does not anticipate remediating inside a "facility" at OU1 or OU2.			✓
MACA, MCA 75-2-501 et seq., ARM 17.74.351, ARM 17.74.365	Applicable/ Relevant and Appropriate/ Other Requirements	Adopts and incorporates by reference 40 CFR subparts A and M (NESHAP) for asbestos, and the National Institute of Occupational Safety and Health Manual of Analytical Methods for detecting asbestos by phase contrast microscopy and a description of the 7402 Analytical Method for detecting asbestos by transmission electron microscopy. It requires that training for asbestos workers,	Only the provisions governing the handling of RACM would be considered relevant and appropriate requirements. Training requirements are not considered ARARs but would be considered as Other Requirements.	✓		✓

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chemical	Location	Action
State of Montana ARARs						
		supervisors, inspectors, project management planners, and project designers meet requirements of 40 CFR 763, subpart E, Appendix C (Asbestos Model Accreditation Plan).				
The Montana Asbestos Control Manual (the Manual)	Applicable/ Relevant and Appropriate/ Other Requirements	The Manual is adopted and incorporated by reference in ARM 17.74.351. It identifies practices and procedures for inspecting for asbestos, conducting asbestos projects, and clearing asbestos projects. MDEQ administers NESHAP through its asbestos control program. NESHAP contains standards that regulate building demolitions, renovations, asbestos disposal sites, and other sources of asbestos emissions.	Only the portions of the Manual that pertain to handling of RACM would be considered applicable or relevant and appropriate. As EPA does not expect to encounter RACM at OU1 or OU2, they will most likely be only relevant and appropriate.	✓		✓
Clean Air Act of Montana, MCA 75-2-101, ARM 17.8.204, ARM 17.8.206	Relevant and Appropriate	Ambient Air Monitoring & Ambient Air Methods and Data require that all ambient air monitoring, sampling and data collection, recording, analysis and transmittal be in compliance with the Montana Quality Assurance Manual except when more stringent requirements are determined necessary.	These requirements will be followed unless an equivalent or more stringent approach is deemed appropriate.	✓		
Clean Air Act of Montana, MCA 75-2-101, ARM 17.8.220, ARM 17.8.223	Applicable	Ambient Air Quality. The standard for settled particulate matter (PM) specifies that settled PM in ambient air shall not exceed a 30-day average of 10 grams per square meter. PM-10 concentrations in the ambient air shall not exceed 150 micrograms/m3 of air on a 24-hour average and 50 micrograms/m3 of air on an annual average.	The removal action will involve significant soil disturbance. Particulate/dust levels will need to be controlled. The ambient air quality standards include specific requirements and methodologies for monitoring and detection. These requirements will be followed unless an equivalent or more stringent approach is deemed appropriate.	✓		✓
Clean Air Act of Montana, MCA 75-2-101, ARM 17.8.304	Applicable	Visible Air Contaminants. No source may discharge emissions to the atmosphere that exhibit opacity of 20% or greater, averaged over six consecutive minutes. This standard is limited to point sources, but excludes motor vehicles.	No visible emissions are anticipated.	✓		✓
Clean Air Act of Montana, MCA 75-2-101, ARM 17.8.308	Applicable	Airborne Particulate Matter. Emissions of airborne particulate matter from any stationary source shall not exhibit opacity of 20 percent or greater, averaged over six consecutive minutes.	This standard applies to the production, handling, transportation, or storage of any material; use of streets, roads, or parking lots; and to construction or demolition projects.	✓		✓

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
			State of Montana ARARs			
ARM 17.24.761	Applicable	Fugitive dust control measures must be met.				✓
Local Air Pollution Control Program, MCA 75-3-301	Applicable	The provisions of the Lincoln County Air Pollution Control Program, approved by Montana DEQ pursuant to § 75-2-301, MCA and administered by Lincoln County, are designed to regulate activities in a designated Air Pollution Control District to achieve and maintain such levels of air quality as will protect human health and safety and, to the greatest degree practicable, prevent injury to plant and animal life and property, and facilitate the enjoyment of the natural attractions of Lincoln County.			✓	✓
Montana Water Quality Act (MWQA), MCA 75-5-101, et seq., and implementing regulations at ARM 17.30.101	Applicable	General. The Clean Water Act, 33 U.S.C. § 1251, et seq., provides the authority for each state to adopt water quality standards (40 CFR Part 131) designed to protect beneficial uses of each water body and requires each state to designate uses for each water body. The MWQA, § 75-5-101, et seq., MCA establishes requirements for restoring and maintaining quality of surface and ground water. ARM 17.30.601, et seq., establishes the Water-Use Classification system. Under ARM § 17.30.609, the water-use for the Kootenai River is "B-1." Under ARM 17.30.623(1), B-1 waters are to be maintained suitable for drinking, culinary, and food processing use after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl, furbearers; and agricultural and industrial water supply. Ditches and certain other bodies of surface water must also meet these requirements.[7] Certain portions of the B-1 standards, codified at ARM § 17.30.623, as well as Montana's nondegradation requirements, are presented below.			✓	

[7] As provided under ARM § 17.30.602(33), "'surface waters' means any waters on the earth's surface, including but not limited to, streams, lakes, ponds, and reservoirs; and irrigation and drainage systems discharging directly into a stream, lake, pond, reservoir or other surface water. Water bodies used solely for treating, transporting or impounding pollutants shall not be considered surface water."

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
State of Montana ARARs						
Montana Water Quality Act, MCA 75-5-101, et seq., ARM 17.30.623	Applicable	Waters classified B-1 are, after conventional treatment for removal of naturally present impurities, suitable for drinking, culinary and food processing purposes. These waters are also suitable for bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and use for agricultural and industrial purposes. This section provides also that concentrations of carcinogenic, bioconcentrating, toxic or harmful parameters which would remain in water after conventional water treatment may not exceed standards set forth in MDEQ circular DEQ-7. DEQ-7 provides that "whenever both Aquatic Life Standards and Human Health Standards exist for the same analyte, the more restrictive of these values will be used as the numeric Surface Water Quality Standard." The numerical standard for asbestos, is based on the MCL for drinking water regulations of 7,000,000 fibers/liter. The concentration may not exceed this limit in any sample.	The remedial action is not expected to impact surface water or groundwater.	✓		✓
Montana Water Quality Act, MCA 75-5-101, et seq., ARM 17.30.637	Applicable	No waste may be discharged and no activities conducted which, either alone or in combination with other waste activities, will cause violation of surface water quality standards; provided a short term exemption from a surface water quality standard may be authorized by the MDEQ for "emergency remediation activities " under the conditions specified in § 75-5-308, MCA.	This requirement would be triggered only in the event that the removal action impacts surface or groundwater. Excavation may take place close to the Kootenai River. Precautions will need to be put into place to prevent accidental release of asbestos containing soils into the river.	✓		
ARM 17.24.633	Applicable	Stormwater. All surface drainage from the disturbed area must be treated by the best technology currently available.				
ARM 17.30.601, et seq., and ARM 17.30.1301, et seq., including ARM 17.30.1341	Applicable	The substantative requirements of the general permit for stormwater for construction activities - General Permit for Storm Water Discharge Associated with Construction Activity, Permit No. MTR100000 (April 16, 2007) (Expires midnight December 31, 2011) are applicable.	Generally, the permit requires best management practices to prevent discharges which have a reasonable likelihood of adversely affecting human health or the environment.			

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
State of Montana ARARs						
The Natural Streambed and Land Preservation Act of 1975, MCA 75-7-101, et seq. ARM 36.2.401, et seq., and substantive provisions of MCA 87-5-502 and 87-5-504	Applicable/ Relevant and Appropriate	Establishes minimum standards if a project alters or affects a streambed, including any channel change, new diversion, riprap or other stream-bank protection project, jetty, new dam or reservoir or other commercial, industrial or residential development.	The remedial action may require stream-bank protection. If so, the substantive portions of these requirements would be applicable.			✓
Montana Floodplain and Floodway Management Act, MCA 76-5-401 et seq., and implementing regulations, ARM 36.15.601 et seq.	Applicable/ Relevant and Appropriate	The Floodplain and Floodway Management Act and regulations specify types of uses and structures that are allowed or prohibited in the designated 100-year floodway and floodplain. OU1 and OU2 are adjacent to the Kootenai River, and these standards are relevant to all actions within the floodplain.	According to the National Flood Insurance Program, Floodway Boundary and Floodway Map, the Former Export Plant property is outside the 100-year flood plain. The Screening Plant, which is at a higher elevation, is also presumed to be outside the 100-year flood plain.No solid waste disposal will occur in the floodway or floodplain.		✓	
Montana Floodplain and Floodway Management Act, MCA 76-5-401 et seq., ARM 36.15.602(5), ARM 36.15.605, ARM 36.15.703	Relevant and Appropriate	Solid and hazardous waste disposal and storage of toxic, flammable, hazardous or explosive materials are prohibited anywhere in floodways or floodplains.	The selected action will not result in excavation of materials considered toxic or hazardous. In any event, excavated materials will not be disposed in a flood plain.		✓	

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chemical	Location	Action
State of Montana ARARs						
Montana Floodplain and Floodway Management Act, MCA 76-5-401 et seq., ARM 36.15.701 ARM 36.15.702(2)	Relevant and Appropriate	In the flood fringe (i.e., in the floodplain but outside the floodway), residential, commercial, industrial, and other structures may be permitted subject to certain conditions relating to placement of fill, roads, and flood proofing. Standards for residential, commercial or industrial structures are found in ARM 36.15.702(2).			✓	
Solid Waste Management Act MCA 75-10-201 and implementing regulations ARM 17.50.501, et seq.	Applicable	The statute and regulations are applicable to the management and disposal of all solid wastes.	EPA expects to encounter soils with asbestos at concentrations <1% at OU1 and OU2. The material is not RACM and qualifies as Group III waste. Substantive requirements for Class III landfills are therefore applicable at locations where the material is disposed. Debris generated in connection with the remedial action will be handled as Group IV waste.			✓
ARM 17.50.503	Applicable	Sets forth definitions for types of solid wastes including Group III and IV wastes.	The material to be excavated from OU1 and OU2 qualifies as a Group III waste. Debris generated as part of the remedial action qualifies as Group IV waste.			✓
ARM Title 17, Chapter 50, subchapter 11	Applicable	Sets forth standards that all solid waste disposal sites must meet including run-on and run-off control system requirements, requirements that sites be fenced to prevent unauthorized access, and prohibitions of point source and nonpoint source discharges which would violate Clean Water Act requirements.	Only the substantive requirements for Class III landfills are applicable. Substantive requirements for Class IV landfills are applicable to debris.			✓
ARM 17.50.1115	Relevant and Appropriate	The owner or operator of a solid waste management facility shall manage asbestos contaminated material in accordance with 40 CFR Part 61, subpart M as adopted by reference in ARM 17.74.351.	These requirements are not expected to apply as EPA does not believe it will encounter RACM at OU1 or OU2. Portions of these requirements may be considered relevant and appropriate.			✓
MCA 75-10-212 and ARM 17.50.523	Applicable	For solid wastes, MCA § 75-10-212 prohibits dumping or leaving any debris or refuse upon or within 200 yards of any highway, road, street, or alley of the State or other public property, or on privately owned property where hunting, fishing, or other recreation is permitted. ARM 17.50.523 specifies that solid waste must be transported in such a manner as to prevent its discharge, dumping, spilling or leaking from the transport vehicle.				✓

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chemical	Location	Action
State of Montana ARARs						
ARM 17.50.1117 and 17.50.1118	Applicable	These provisions set forth criteria for Class III and Class IV landfills.	EPA expects that excavated soils will qualify as Group III wastes and associate debris will qualify as Group IV wastes.			✓
ARM Title 17, Chapter 50, Subchapters 12, 13, and 14	Applicable	Provide additional design criteria, ground water monitoring, corrective action, and closure requirements for Class IV landfills. Subchapter 14 also contains closure requirements for Class III landfills.	EPA expects that soils to be excavated at OUs 1 and 2 will qualify as Group III wastes.			✓
MCA 75-10-206	Applicable	Provides for a variance from certain solid waste requirements where such variance would not result in a danger to public health or safety.				✓
Montana Antiquities Act, MCA 22-3-421, et seq.	Relevant and Appropriate	Montana Antiquities Act addresses the responsibilities of State agencies regarding historic and prehistoric sites including buildings, structures, paleontological sites, archaeological sites on state owned lands. Each State agency is responsible for establishing rules regarding historic resources under their jurisdiction which address National Register eligibility, appropriate permitting procedures and other historic preservation goals. The State Historic Preservation Office maintains information related to the responsibilities of State Agencies under the Antiquities Act.			✓	
Montana Human Skeletal Remains and Burial Site Protection Act (1991), MCA 22-3-801, et seq.	Applicable	The Human Skeletal Remains and Burial Site Protection Act is the result of years of work by Montana Tribes, State agencies and organizations interested in ensuring that all graves within the State of Montana are adequately protected. If human skeletal remains or burial sites are encountered during remedial activities within OU1 and OU2, then these requirements will be applicable.			✓	

Statue and Regulatory Citation	ARAR Determination	Description	Comment	Chem-ical	Loca-tion	Action
State of Montana ARARs						
MCA 87-5-502 and 504	Applicable	Provide that a state agency or subdivision shall not construct, modify, operate, maintain or fail to maintain any construction project or hydraulic project which may or will obstruct, damage, diminish, destroy, change, modify, or vary the natural existing shape and form of any stream or its banks or tributaries in a manner that will adversely affect any fish or game habitat. The requirement that any such project must eliminate or diminish any adverse effect on fish or game habitat is applicable to the state in approving remedial actions to be conducted. The Natural Streambed and Land Preservation Act of 1975, MCA 75-7-101, et seq., (Applicable -- substantive provisions only) includes similar requirements and is applicable to private parties as well as government agencies.	Consultation with the Montana Department of Fish, Wildlife and Parks, and any conservation district or board of county commissioners (or consolidated city/county government) is encouraged during the designing and implementation of the remedial action for OU1 and OU2.		✓	
Noxious Weeds, MCA 7-22-2101(8)(a) and ARM 4.5.201, et seq.	Applicable	MCA 7-22-2101(8)(a) "noxious weeds" must be managed consistent with weed management criteria developed under MCA 7-22-2109(2)(b).				✓
Occupational Health Act MCA 50-70-101, et seq., ARM 17.74.101 ARM 17.74.102	Other Requirements	ARM 17.74.101, along with the similar Federal standard in 29 CFR §1910.95, addresses occupational noise. ARM 17.74.102, along with the similar federal standard in 29 CFR 1910.1000 addresses occupational air contaminants.	These requirements will be addressed as part of the Health & Safety Plan and do not meet the definition of an ARAR.			✓
Montana Safety Act MCA 50-71-201, 202 and 203	Other Requirements	Every employer must provide and maintain a safe place of employment, provide and require use of safety devices and safeguards, and ensure that operations and processes are reasonably adequate to render the place of employment safe. The employer must also do every other thing reasonably necessary to protect the life and safety of its employees. Employees are prohibited from refusing to use or interfering with the use of safety devices.	These requirements will be addressed as part of the Health & Safety Plan and do not meet the definition of an ARAR.			✓
Employee and Community Hazardous Chemical Information Act, MCA 50-78-201, MCA 50-78-202, MCA 50-78-204	Other Requirements	State that each employer must post notice of employee rights, maintain at the work place a list of chemical names of each chemical in the work place, and indicate the work area where the chemical is stored or used. Employees must be informed of the chemicals at the work place and trained in the proper handling of the chemicals.	These requirements will be addressed as part of the Health & Safety Plan and do not meet the definition of an ARAR.			✓

Preferred Remedy Compliance with ARAR Evaluation	
Evaluation Factors for Compliance with ARARs	**Evaluation Summary**
Compliance with Chemical-Specific ARARs	Contaminated soil at depth contained in-place with soil cover with all surface soil removed and disposed of offsite excavations backfilled would physically address contaminant sources and prevent discharges of asbestos fibers to air, thus meeting visible emissions requirements of NESHAP and chemical-specific ARARs for air.
Compliance with Location-Specific ARARs	Location-specific ARARs for the remedy would be addressed during implementation of the remedial action.
Compliance with Action-Specific ARARs	Action-specific ARARs for the remedy would be addressed during implementation of the remedial action. Specifically, as per EPA's determination the cover requirements specified under NESHAP (40 CFR 61.151) are a potential consideration as a relevant and appropriate ARARs for the site and would be in compliance with this ARAR as allowed under 40 CFR 61.151(c).

Acronyms

ARAR	Applicable or Relevant and Appropriate Requirements
ARM	Administrative Rules of Montana
BMP	Best Management Practices
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
MCA	Montana Code Annotated
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NCRS	Natural Resources Conservation Service
OSHA	Occupational Safety and Health Administration
RACM	Regulated Asbestos Containing Material
RCRA	Resource Conservation and Recovery Act
SHPO	State Historic Preservation Office
TSCA	Toxic Substances Control Act
U.S.C	United States Code